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CGIAR

Annual Report

Consultative Group on International
Agricultural Research



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CGIAR@cgnet.com or CGIAR@worldbank.org. October 1996.



*T*his group has come together to deal with a problem of first importance. I suspect that when the history of these so-called development decades comes to be written, the revolution in agricultural technology will be singled out as one of their outstanding achievements, and I hope and believe that this group, as it develops over the years, may have a significant role to play in supporting and accelerating that revolution.

—R. H. Demuth, Chairman, at the first formal meeting of the CGIAR, May 19, 1971, Washington, DC.



AT ILRI MOLECULAR BIOLOGY IS USED IN THE FIGHT AGAINST PARASITIC DISEASES OF LIVESTOCK. HERE A SCIENTIST ISOLATES A FRAGMENT OF DNA FROM *THEILERIA PARVA*. THIS TECHNIQUE IS USED IN THE DEVELOPMENT OF DIAGNOSTIC TOOLS AND VACCINES.

*W*e must work steadfastly with others, deploying the weapons of solidarity and using the ammunition of cooperation on the front lines of the battles against hunger and poverty. We must be unflinching in our commitment to help liberate the deprived and disadvantaged from bondage. And we shall prevail.

—Ismail Serageldin, 1995



*R*ICE IS THE STAPLE FOOD FOR HALF OF THE WORLD'S PEOPLE. IN MADAGASCAR, THE SECOND LARGEST RICE PRODUCER IN AFRICA, RICE IS A MAJOR PART OF EVERY MEAL AND IS CULTURALLY IMPORTANT FOR THE MALAGASY PEOPLE. SINCE 1984, THE MADAGASCAR-IRRI RICE RESEARCH PROJECT, FUNDED BY USAID, HAS FOCUSED EFFORTS ON RICE VARIETAL IMPROVEMENT, FERTILIZER MANAGEMENT, CULTURAL PRACTICES, AND POTENTIAL OFF-SEASON CROPS FOR RICE-BASED CROPPING SYSTEMS. MUCH OF THE WORK HAS INVOLVED COLLABORATIVE EFFORTS WITH THE NATIONAL CENTER FOR APPLIED RESEARCH ON RURAL DEVELOPMENT (FOFIFA).



*T*HE NILWALA WATERSHED,
LOCATED IN THE WET ZONE OF SRI
LANKA, IS PART OF AN IIMI ACTION
RESEARCH PROJECT TO EVALUATE
THE IMPACT OF A NUMBER OF INTER-
VENTIONS DESIGNED TO IMPROVE
WATERSHED PRODUCTIVITY AND
SUSTAINABILITY.

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List of Acronyms

ARI	Advanced Research Institution
CGIAR	Consultative Group on International Agricultural Research
DAC	Development Assistance Committee, OECD
FAO	Food and Agriculture Organization of the United Nations
GNP	Gross National Product
IAEG	Impact Assessment and Evaluation Group, CGIAR
ICW	International Centers Week, CGIAR
IFAD	International Fund for Agricultural Development
IICA	Instituto Internacional de Cooperación para la Agricultura
IRM	Integrated Resource Management, ICLARM
LAC	Latin America and the Caribbean
MTM	Mid-Term Meeting, CGIAR
NARS	National Agricultural Research System(s)
NGO	Non-Governmental Organization
TAC	Technical Advisory Committee, CGIAR
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
ORSTOM	Institut Français de Recherche Scientifique pour le Développement en Coopération
SDC	Swiss Development Cooperation
SSA	Sub-Saharan Africa
UK ODA	Overseas Development Administration, United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US	United States
USAID	United States Agency for International Development
WANA	West Asia and North Africa
WIRFS	Women in Rice Farming Systems, IRRI
\$	All financial data are given in US dollars

CGIAR Centers

CIAT	Centro Internacional de Agricultura Tropical
CIFOR	Center for International Forestry Research
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo
CIP	Centro Internacional de la Papa
ICARDA	International Center for Agricultural Research in the Dry Areas
ICLARM	International Center for Living Aquatic Resources Management
ICRAF	International Centre for Research in Agroforestry
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFPRI	International Food Policy Research Institute
IIMI	International Irrigation Management Institute
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IPGRI	International Plant Genetic Resources Institute
IRRI	International Rice Research Institute
ISNAR	International Service for National Agricultural Research
WARDA	West Africa Rice Development Association



*S*INCE 1974 IPGRI HAS SUPPORTED
GROUND-BREAKING RESEARCH TO
IMPROVE CONSERVATION TECHNOLO-
GIES FOR PLANT GENETIC RESOURCES
AND TO DEVELOP STANDARDS FOR
STORAGE, MONITORING, AND
MANAGEMENT THAT ARE USED IN
GENEBANKS ALL OVER THE WORLD.

About the CGIAR

AN OVERVIEW

The Consultative Group on International Agricultural Research is an informal association of fifty-two public and private sector members, from the South and North, whose mission is to contribute through research to sustainable agriculture for food security in developing countries. FAO, UNDP, UNEP, and the World Bank are the CGIAR's four cosponsors.

The vision of the CGIAR is for its research to have a positive impact on food security, income and employment generation, and conservation of natural resources and the environment. The defining terms of this vision are: less poverty; a healthier, better-nourished human family; reduced pressure on fragile natural resources; and people-centered policies for sustainable development.

The CGIAR fulfills its mission through the formulation and implementation of a research agenda, carried out by a network of sixteen international agricultural research centers, whose work it supports. Since its establishment in 1971—to consolidate and spread the benefits of international agricultural research beyond Asia, where unprecedented harvests from new varieties of rice and wheat overcame the threat of famine in the late 1960s—membership in the CGIAR has increased and the research supported by the CGIAR has expanded and diversified.

Today, productivity and natural resources management are the twin pillars of CGIAR research on food crops, forestry, livestock, irrigation management, aquatic resources, and policy issues, and in its services to national agricultural research systems. Research supported by the CGIAR covers commodities that provide 75 percent of food energy and a similar share of protein requirements in developing countries.

Decisions on research policy are made, and research programs are carried out, in consultation and collaboration with a range of partners in the global agricultural research system, including national agricultural research systems in developing countries, advanced research institutes, non-governmental organizations, farmer associations, community organizations, and the private sector.

Membership in the CGIAR is open to any country, foundation, and international or regional organization which: supports the mission of the

CGIAR; is willing to participate in decisionmaking and, in particular, the adoption of the system's research agenda; and is committed to providing support for the implementation of that agenda. Contributions by CGIAR members are voluntary, and are made as grants. Each CGIAR member is free to contribute directly to the center(s) of its choice. The bulk of the contributions are in support of the agreed research agenda. Research activities included in the agreed agenda are expected to meet four criteria. They must:

- be aimed at producing research or research-related international public goods;
- be of high priority in terms of achieving the CGIAR's goals and objectives;
- have acceptable probabilities of success; and
- have no alternative producers or sources of supply with suitable costs or reliability.

R E S E A R C H A N D I T S I M P A C T

The founders of the CGIAR were convinced that new, science-based agricultural technologies could be effective weapons on the front lines in the battles against hunger and poverty. At its founding, the CGIAR decided that its activities would be based on “technical as well as on ecological, economic, and social factors.” Thus, the research agenda of the CGIAR has changed over time, as knowledge about the dynamics of development has sharpened, and the demands on agricultural research have grown more complex.

The research agenda of the CGIAR system is recommended annually to the membership by TAC, based on proposals from the centers. When endorsed by the Group, the research agenda becomes eligible for financing by CGIAR members.

Research programs carried out by individual centers or through systemwide initiatives include: biological research to increase yields through genetic improvement and resistance to pests and diseases; integrated pest management programs and biological control methods that save crops

from destruction, while at the same time enabling farmers to reduce the use of pesticides; genetic resources conservation and classification; programs for sustainable natural resources management, such as soil and water and tropical forests; policy studies; and institution building to strengthen NARS.

The continuing transformation in tropical agriculture brought about by the CGIAR system and its partners has had a five-fold impact in developing countries, as described below:

Increased productivity has made more food available. Globally one of the greatest achievements of this century has been the phenomenal increase of agricultural productivity through the adoption of science-based technologies. The data in Asia is striking. Over the thirty years ending in 1991, rice production increased by 123 percent, with yields increasing by approximately 88 percent. Wheat production rose by 338 percent, with yields increasing by 204 percent.

Increased productivity has preserved land and biodiversity. By being able to feed many more people from each hectare of land suitable for high-yield agricultural production, many hectares of environmentally sensitive land have been conserved, and their biodiversity protected.

Lower food prices and increased incomes have made more food accessible to more people. The impact of food access on poverty alleviation is manifest in many countries in Asia and Latin America. The consumer price of rice and wheat in Asia dropped by over 40 percent between 1960 and 1990. The poor have benefited greatly from expanded food security because they spend a higher proportion of their income on food than do others.

Higher calorie intake has improved nutrition and health, and increased life expectancy. This has been observed in developing countries generally, and specifically in the green revolution countries of Asia. In developing countries, life expectancy at birth has risen from an average of 47.4 years in 1960 to 1965 to 62.4 years in 1990 to 1995. Life expectancy at birth in India, a pioneering green revolution country, is 61 years. Similarly, the daily per capita calorie intake in developing countries has grown from 2,060 in 1960 to 2,470 in 1990. The figure for India is 2,230.

The contribution of agriculture to growth has led to overall economic advances. In this area as well, Asia, where agricultural development has almost always preceded development in general, is a showcase of results. Last year, for instance, the 59 countries of Asia and the Pacific region recorded an average growth of 7.8 percent compared to a world average of 2.6 percent.

MEETING FUTURE CHALLENGES

As the world moves toward 2020, when the world's population will be about 9 billion—7 billion in developing countries—the world's very poor will number one and a half billion. Some 70 percent of the poor will be women. Within the same time frame, urbanization and increased income in developing countries are likely to change dietary habits, increasing the demand for livestock and high-value agricultural products. This, in turn, will increase the demand for cereals and coarse grains for use as animal feed, in addition to their fundamental use as food for people.

Simultaneously, current trends suggest that the world will continue to face serious environmental concerns such as water and wind erosion, loss of soil nutrients, salinization, water logging, tropical deforestation, and loss of biodiversity, unless corrective measures are taken. Agriculture is at the heart of any effective solution to the nexus of problems encompassing population growth, environmental destruction, poverty, and food insecurity.

To prepare itself to meet these challenges, the CGIAR undertook an eighteen-month program of renewal, beginning in May 1994, to clarify its vision, refocus its research agenda, broaden its partnerships, stabilize its finances, and tighten its governance and operations. A key event of the renewal program was a Ministerial-Level Meeting held in Lucerne, Switzerland in February 1995, at which participants adopted a *Declaration and Action Program* that serves as the charter of the CGIAR.

Based on the principles adopted as part of the renewal program, the CGIAR will focus over the next twenty years on five major research thrusts:

Improving Productivity. The CGIAR strives to make developing country agriculture more productive through genetic improvements in plants, live-

stock, fish, and trees, and through better management practices. One important feature of the CGIAR's breeding research is its focus on building into plants greater resistance to insects and diseases that adversely affect productivity and the stability of production in the tropics. While protecting farmers from losses, these improved plants protect the environment because they require little, if any, chemical controls.


Protecting the Environment. Conserving natural resources, especially soil and water, and reducing any impact of agriculture on the surrounding environment, is an essential, and growing, part of the CGIAR's efforts. The CGIAR plays a leading role in developing new research methods to identify long-term trends in major agricultural environments, and in developing solutions to pressing environmental problems.

Saving Biodiversity. The CGIAR holds in trust for the future one of the world's largest collections of *ex situ* genetic resources, containing over 600,000 accessions of more than 3,000 crop, forage, and pasture species. The collection includes improved varieties and, in substantial measure, the wild species from which those varieties were created. Duplicates of these materials are freely available to researchers around the world so that new gene combinations can be brought to bear on current problems. The CGIAR has placed its collections under the auspices of FAO as part of an international network of *ex situ* collections.

Improving Policies. Agricultural producers are heavily influenced by public policy. The CGIAR's policy research aims to help streamline and improve policies that strongly influence the spread of new technologies and the management and use of natural resources.

Strengthening National Programs. The CGIAR is committed to strengthening national agricultural research in developing countries through working relationships with colleagues in national programs, strengthening skills in research administration and management, and formal training programs for research staff.

Revitalized by its program of renewal, the CGIAR looks to the future with greater openness and solidarity with its partners than ever before. The CGIAR is today a fully South-North enterprise committed to working with its many partners in the global agricultural research system to make lasting improvements in the lives of the world's poor and disadvantaged.

The CGIAR's ability to combine knowledge about the needs of farmers and the environment in developing countries with knowledge of the opportunities to be gained through advances in science, as well as its non-political character, will be critical factors for the successful development of new technologies to help the poor. Together with its partners, the CGIAR seeks to fulfill a vision in which sustainable agriculture, food security, poverty alleviation, and protection of the environment in developing countries are everyday realities. 

PART *One*

The Year in Review

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A large pile of harvested potatoes in a greenhouse. In the background, several workers wearing head coverings are visible, some standing and some working near the potato pile. The structure of the greenhouse is made of wooden poles and translucent plastic covering.

*W*HILE POTATO PRODUCTION IN EGYPT IS GROWING AT AN ANNUAL RATE OF 4.8 PERCENT, MOST POTATOES PLANTED ARE GROWN FROM IMPORTED TUBER SEED. TO RESOLVE THIS PROBLEM, THE EGYPTIAN MINISTRY OF AGRICULTURE, IN COOPERATION WITH CIP, IS PIONEERING THE USE OF TRUE POTATO SEED (TPS) TECHNOLOGY. TPS ARE THE TINY BOTANICAL SEEDS PRODUCED ABOVE GROUND BY THE FLOWER OF THE PLANT. ONLY 100 GRAMS OF TPS—VALUED AT \$80 TO \$100—ARE NEEDED TO PLANT A HECTARE, COMPARED TO TWO TONS OF IMPORTED TUBER SEED, VALUED AT \$1,200.

Introduction

Alexander von der Osten
CGIAR Executive Secretary



This Annual Report, published by the CGIAR Secretariat to complement center-specific reports, is special. Its reporting period, from the 1995 Mid-Term Meeting to the conclusion of the 1996 Mid-Term Meeting, includes the twenty-fifth anniversary of the first formal meeting of the CGIAR on May 19, 1971. Formal commemoration of that anniversary will take place in October 1996 during International Centers Week.

From the next Annual Report, we will revert to a format of calendar year coverage.

The current reporting period saw the conclusion of the renewal program that was inaugurated in mid-1994. CGIAR Chairman Ismail Serageldin made it clear on several occasions that the renewal program required a deliberate and rational selection of the best from past practices to serve as the foundation of change. Its purpose was not to abandon the past recklessly.

In that spirit, many of the founding features of the CGIAR remain intact and have been strengthened. The CGIAR is a voluntary association of like-minded institutions, without a formal charter. It is collegial in spirit and reaches decisions by consensus, thus avoiding the rigidities and frustrations of head counts. It is apolitical. Its approach to problem solving transcends national boundaries. Its activities are science-based. Strategic agricultural research is its central focus.

While these strengths have been preserved, there can be no doubt that the CGIAR of today has, indeed, been transformed in six respects.

First, the membership of the CGIAR has changed from being purely a highly motivated group of ODA donors to a group that actively seeks a South-North identity. Today, sixteen members of the CGIAR are from the South, up from zero twenty-five years ago. As Southern influence grows, other components of the CGIAR system will also, no doubt, fully reflect a South-North composition.

Second, the research agenda has been refocused on the nexus of agriculture, the environment, and poverty as the basis for sustainable agriculture for food security in developing countries. The founding resolution of the CGIAR adopted in 1971 said that the Consultative Group and TAC, in all their deliberations, should take into account not only


“technical, but also ecological, economic, and social factors.” This approach has been integrated and widened to permeate, not only deliberations by the Group or TAC, but also all research conducted by the centers.

Third, poverty alleviation has been recognized as the ultimate purpose of CGIAR-supported research, a principle that guides both the kinds of research conducted and the areas in which CGIAR activities are conducted.

Fourth, a culture of partnership has been entrenched within the CGIAR system. Few events made this more clear than the Preparatory Meeting at MTM96 in Jakarta for the Global Forum that will be held as part of ICW96. The mutual respect, understanding, and endeavor that characterized the deliberations among a broad spectrum of representatives of the global agricultural research system showed precisely how productively the new partnership mode can work in the future.

Fifth, the principle of the research agenda as the primary repository of funding has been widely accepted. Even the blip of uncertainty over potential underfunding of the 1996 research agenda, noted at MTM96, could be corrected because both members and centers respected this principle.

Sixth, governance mechanisms have been streamlined in the interest of effectiveness and transparency, and to ensure that the impact and relevance of CGIAR-supported research are scientifically assessed.

These are great developments. Together, they represent a renewed CGIAR capable of contributing to human development as effectively in the future as the CGIAR has done, under somewhat different circumstances, in the past. 



Timothy S. Rothermel (left) receiving a scroll of thanks for his distinguished service to the CGIAR from Ismail Serageldin (right).

FAREWELL TO TIMOTHY S. ROTHERMEL


At MTM96 the CGIAR said farewell to Mr. Timothy S. Rothermel, who had been the UNDP representative at CGIAR meetings for ten years. Mr. Serageldin paid special tribute to Mr. Rothermel, saying that he had been an extraordinary voice within the CGIAR, bringing judgment and balance to the CGIAR system through his participation in cosponsors meetings, in plenary sessions of the Group, and in his dealings with the Centers. He had been an equally strong supporter of the CGIAR within the UN system.

Mr. Rothermel made a moving response, commenting on the nature and importance of the CGIAR to the goals of human development. He said that the opportunity to be associated with the CGIAR had been the most rewarding aspect of his career.

The Group adopted a resolution, printed on a scroll of thanks, which was presented to Mr. Rothermel by Mr. Serageldin. The text of the resolution follows:

In recognition of his strong interest in tropical agriculture, his wealth of knowledge in agricultural research, and his dedicated commitment to the mission of the CGIAR, the members of the Consultative Group on International Agricultural Research wish to record their gratitude to Timothy S. Rothermel for his distinguished service as a cosponsor of the CGIAR (1985-1996), representing the United Nations Development Programme, and offer him warm felicitations for the future.

Farewell

A photograph of a market stall in Tashkent, Uzbekistan. In the foreground, a man with glasses and a dark jacket is smiling and holding a large red plastic jug. Behind him, another man in a dark jacket is also smiling. On the table in front of them are several large plastic jugs, some containing a yellow liquid, likely milk. The background shows the structure of the market stall and other people in the distance.

*G*HEE, AN IMPORTANT LIVESTOCK PRODUCT, ON SALE IN A MARKET IN TASHKENT. UZBEKISTAN IS ONE OF FIVE CENTRAL ASIAN REPUBLICS WITH WHICH ICARDA IS WORKING ON A JOINT PROJECT INVOLVING CGIAR AND NON-CGIAR PARTNERS, TO ESTABLISH COOPERATION IN THE REGION. THE PROJECT ENCOMPASSES A RANGE OF INITIATIVES. ICARDA IS SPECIFICALLY HELPING TO IDENTIFY AND TEST TECHNOLOGIES FOR DIVERSIFYING AGRICULTURE AND IMPROVING CROP AND LIVESTOCK PRODUCTIVITY, AND TO STRENGTHEN NATIONAL SEED PROGRAMS AND HUMAN RESOURCES.

Highlights of Events and Trends

RENEWAL COMPLETED

An eighteen-month program of renewal, launched at the New Delhi Mid-Term Meeting of the CGIAR in May 1994, was successfully concluded at International Centers Week in October 1995, where a revitalized CGIAR system prepared itself to confront future challenges.

ICW95 was the fifth milestone in what has been widely described as a “journey of renewal.” The five milestones were: the 1994 Mid-Term Meeting in New Delhi; International Centers Week 1994; a Ministerial-Level Meeting, held in Lucerne, Switzerland in February 1995; the 1994 Mid-Term Meeting in Nairobi in May; and International Centers Week 1995 in October. To reach and pass each milestone, the CGIAR was required to complete a specified set of tasks and responsibilities. This program was completed without time slippage and with all tasks fully achieved.

The fifth milestone represented both an end and a new beginning. The renewal program equipped the CGIAR system to move forward—“with a greater degree of confidence than before, but not over-confidence,” CGIAR Chairman Ismail Serageldin said—in association with new and old partners, toward the goal of a healthier, more viable South.

In 1994 the CGIAR faced a crisis of confidence. Its most visible manifestation was a decline in funding for the research agenda approved by members for implementation by the centers, and the increasing flow of funds to projects outside of the agenda, since 1992. The decline was expected to persist in 1994 and 1995, thereby threatening the continuity and effectiveness of research at the centers. Behind the financial factor, however, there were a number of other uncertainties that reached deep into the vision, programs, governance, and approach of the CGIAR system. While the strengths of the system remained firmly in place, weaknesses threatened them.

It was against this background that the CGIAR launched a renewal program to “clarify its vision, refocus its research agenda, create greater openness and transparency, strengthen its partnerships, ensure its efficiency and effectiveness, and tighten its governance and operations.”

The first and most pressing need was to adopt and implement a program of short-term financial stabilization. This was accomplished in less time than anticipated. At the heart of the stabilization program was an exceptional

one-time offer by the World Bank to match in 1994 and 1995 additional contributions from other CGIAR members at a 50 percent rate, to a maximum of \$20 million over the two years. The Bank's generous offer was reciprocated by several members, and the Bank's special contribution was fully disbursed. The CGIAR system's budget has continued to be stabilized, as the following record of contributions to the agreed research agenda shows:

1993	\$235 million
1994	\$268 million
1995	\$270 million
1996	\$300 million.

With short-term financial stabilization achieved, it was possible for the major requirements of the renewal program to be undertaken. Almost every aspect of the CGIAR has been affected by the substance of the renewal process. These results, reconfirmed at ICW95, include:

- reaffirmation of international support for international agricultural research as an instrument of development;
- development and strengthening by the CGIAR of a wide range of partnerships within the global agricultural research system;
- integration of CGIAR perspectives with those of the international development community;
- refocusing of research on the nexus of agriculture, the environment, and poverty as the basis of nurturing sustainable agriculture for food security in developing countries;
- renewed emphasis on a number of sustainability issues, including the management of tropical forests, soil and water management, and the productive use of marginal lands inhabited by the poor;
- strengthening and streamlining of governance to ensure transparency and effectiveness;
- establishment of an independent Impact Assessment and Evaluation Group to ensure the continued relevance of CGIAR programs;

- full funding of the research agenda approved by CGIAR members; and
- adoption of a matrix approach to introduce a more transparent, predictable, and stable system of financing.

T O W A R D A S T R O N G E R G L O B A L R E S E A R C H S Y S T E M

A pivotal characteristic of the renewed CGIAR is its determination to create opportunities for full collaboration with a broad array of partners. As the demands on international agricultural research have become more complex, the need to build strong partnerships for a common approach to problem solving has become very clear. Another factor creating momentum toward the development of a strong global research system has been the recognition that new political balances and economic relationships point to an increasingly interdependent world. These realities were recognized and given clear expression by the *Lucerne Declaration and Action Program*, adopted by the Ministerial-Level Meeting.

The *Lucerne Declaration and Action Program* urged the CGIAR to: enrich its dialogue with members of civil society interested in the same issues; convene a committee of NGOs and a committee of the private sector; and, accelerate the process of systematizing the participation of NARS of developing countries in setting and implementing the CGIAR's agenda. The CGIAR was also asked to examine the opportunities for collaborative research in Eastern Europe and in the former Soviet Union. Responding to these proposals, the CGIAR has widened and deepened its dialogue with NARS, formed an NGO Committee and a Private Sector Committee, and established a task force to study the potential for a CGIAR effort in Central/Eastern Europe and the former Soviet Union.

NARS Initiative

The evolving NARS-CGIAR relationship has led to mutual understanding and commitment to a combined effort. Opportunities for increasing both were explored throughout the renewal program at a series of regional NARS meetings, with CGIAR participation. These meetings will lead to a Global Forum which will form part of International Centers Week 1996. As the dialogue proceeded, many misconceptions

and misunderstandings were dispelled. They were replaced by mutual respect, a strong sense of commonality, and a shared vision. Opportunities and limitations were both recognized. These positive trends emerged with clarity at a Preparatory Meeting for the Global Forum held on May 17-18 in Jakarta, Indonesia, immediately prior to the 1996 Mid-Term Meeting.

Clearly defined needs outlined by the Preparatory Meeting to facilitate a stronger partnership included the following:

- developing a more efficient global agricultural research system, with NARS as the cornerstone, to meet present and future challenges;
- building stronger organizations and consultative mechanisms at the regional level;
- broadening NARS to include universities, NGOs, and the private sector, as well as institutions dealing with forestry, fisheries, and natural resources management;
- creating greater transparency in priority setting and greater interaction between TAC and NARS;
- increasing the training of NARS scientists as part of the capacity-building efforts of the CGIAR, universities, the private sector, and other sources, particularly in the area of advanced technologies;
- closing the gap in electronic communications technology between NARS and the CGIAR centers, and providing NARS with wider access to research technologies and databanks; and
- collaborating with farmers and extension services to advance technology generation, dissemination, and utilization.

NARS now comprise a host of actors engaged in research, including universities, NGOs, and the private sector. Their level of involvement with the CGIAR has increased significantly. It was the intent of the Preparatory Meeting to make NARS, in the broadest sense, an integral

part of the operational framework of the CGIAR. While the foundation was laid for an enduring CGIAR-NARS relationship at the Preparatory Meeting, the blueprint for collaboration into the twenty-first century is expected to emerge from the Global Forum at ICW96.

NGO Committee

The NGO Committee envisioned in Lucerne was firmly in place when ICW95 was held, and was well into an active program by MTM96. It is already clear that new partnerships are creating synergies that can invigorate research programs, leading to winning strategies in the battles against poverty and hunger.

CGIAR Chairman Ismail Serageldin consulted NGOs in Africa, Asia, Europe, Latin America, and North America before the NGO Committee was formed. The views of over 150 members of NGOs, and of the over 350 NGOs that work in the field with CGIAR centers, were ascertained. The NGO Committee's origins, therefore, were truly deliberative and consensual. Its mandate is to seek ways to strengthen a people-centered approach to sustainable agricultural research, and to improve mutual understanding among NGOs, the CGIAR, farmer organizations, and fisheries and forestry producer organizations.

To convert this mandate into reality, the NGO Committee identified priority goals for implementation, including:

- promotion of agricultural systems that are environmentally, socially, and economically sustainable;
- promotion of sustainable natural resources management;
- ensuring the conservation of ecological integrity;
- advocacy of equitable opportunities for the urban and rural poor;
- promotion of sustainable livelihoods and food security; and
- empowerment of communities and, particularly, of women's groups.

Progress was clearly evident in 1996, only one year after the formation of the NGO Committee. Linkages with CGIAR centers—some of which have been visited by Committee members—are in place. The Committee's interventions at all levels of the CGIAR system are well established. Future areas for possible cooperation are medium- and long-term planning, external reviews of CGIAR centers, and policymaking by the CGIAR. Both sides of this partnership have much to gain from this relationship, with NGOs serving as a link between farmers and researchers, and the CGIAR providing the framework for advancing the cause of farmers through its programs.

Private Sector Committee

The Private Sector Committee, now fully operational, was established to serve as a focal point and center of expertise on the private sector and its potential collaboration with the CGIAR and with NARS. The Committee is also expected to act as a communicator of private sector perspectives.

In the medium-term, the Committee's main areas of focus and activity will be:

- biotechnology;
- intellectual property rights, genetic resources, and biodiversity policy;
- mechanisms of private sector interaction with centers and NARS; and
- research management practices.

In determining the role of the private sector, the Committee looked at how this sector is involved in the global agricultural research system at present and how it can be more involved in the future. For the most part, the private sector provides for-profit goods. The CGIAR provides public goods. Though these objectives may appear to be dissimilar, in both cases products are derived from publicly-funded upstream technologies. These products are then distributed by the CGIAR and NARS for the public good, or marketed as a private good by the private sector. Given this stratum of complementarities, the Private Sector Committee has been explor-

ing areas for building mutual effort based on common interests. Mutual effort can help to ensure that the entire human family can benefit from various advances in agricultural research.

The Committee expects that the current dialogue between the private sector and the CGIAR will be useful in identifying ways each can assist and supplement the other. However, for the CGIAR to interact fully with the private sector, industry leaders must be made aware of the system and its mission. Meetings and discussions can then lead to collaboration in transferring technologies and product development. Toward this end, the Private Sector Committee has participated in CGIAR deliberations and partnership events, established working groups on specific issues, and reviewed the opportunities for increased interaction with CGIAR centers.

Forging a solid and enduring partnership between the CGIAR and the private sector is considered advantageous for both parties since they have much in common. Both are engaged in international agricultural research over a long-term horizon, both develop products relevant to developing countries, and both are striving to optimize the use of increasingly constrained resources.

Task Force on Central/Eastern Europe and the Former Soviet Union

The Task Force has explored the challenge of collaborative research programs, together with NARS in the region and CGIAR centers. In carrying out this responsibility, the Task Force has been guided by the requirements outlined in Lucerne that such programs should be undertaken only when the comparative advantage of the CGIAR has been identified and only when separate funds are available. The activities of the Task Force to date were endorsed at MTM96. A final report is expected at ICW96.

R E S E A R C H A G E N D A

The poor in developing countries are the intended ultimate beneficiaries of CGIAR activities. International agricultural research is the means by which this goal is realized. Research has, therefore, consistently been the core and focus of the CGIAR. This approach was strongly reaffirmed throughout the renewal program, and was a defining element of the first post-renewal meeting of the CGIAR, MTM96 in Jakarta.

Initially, over twenty-five years ago, international agricultural research was supported as a means of averting mass famine in Asia. That limited but vital objective was fully successful. The goals of research have changed, however, both in response to changing realities in the world and as a result of forward looking assessments by the research community.

The CGIAR has periodically reviewed how best its strength and potential can serve the interests of the poor in developing countries. As the impact on development of the linkage connecting poverty, the environment, and population became clearer, CGIAR policies and research programs were adjusted to ensure that agricultural technology not only increased productivity but also protected the natural resource base on which productivity depends.

By mid-1994, when the CGIAR renewal program was launched, the effectiveness of this approach was evident. By then, research supported by the CGIAR covered commodities that provide 75 percent of food energy and a similar share of protein requirements in developing countries. Production in developing countries would be poorer by several hundred million tons a year without CGIAR-supported research. New crop varieties enabled farmers to increase productivity without expansion of the land area under cultivation. The CGIAR helped to preserve biodiversity, develop integrated pest management programs and biological control methods that reduced the use of pesticides, and to sharpen agricultural policy and strengthen domestic research capacity. Despite these successes, much more remained to be done. Enhanced activity by CGIAR centers would contribute to completing the unfinished agenda of development.

To bring about that enhancement, the renewal program adopted a number of decisions and undertook a number of measures, all of which underpinned the research agenda, and provided the context of the events and trends of this reporting period. A brief recapitulation would include the following:

- a commitment to guarantee that the research agenda drives the CGIAR budget and not *vice versa*;
- a reformulation of the CGIAR mission, with emphasis on research contributing to sustainable agriculture for food security;

- a move toward more inter-center and/or systemwide programs;
- a renewed commitment to protecting biodiversity through research, redefined policies, and collaboration with partners active in this field;
- formulation of programs to deal with high priority sustainability issues (e.g., management of tropical forests, soil and water management, and productive use of marginal lands);
- reaffirmation of TAC's role as the system's preeminent source of strategic analysis and advice; and
- definition of research thrusts that combine all research elements into an integrated anti-poverty approach.

These trends combined in the presentation and discussion, at ICW95 and MTM96, of TAC's proposed priorities and strategies for the immediate future.

TAC emphasized a pro-poor, pro-conservation strategy based on increasing productivity. It focused on conserving resources while providing new products to consumers. TAC stressed the need for emphasis on the rural poor and women. CGIAR programs were linked with connected activities, including participatory programs at the farm level. TAC reviewed the CGIAR's activity areas, recommending increases or decreases according to their applicability to future priorities.

TAC's recommendations were endorsed, with some modifications, as the structure for building the research agenda of tomorrow. Highlights include:

- reaffirmation of the desired emphasis on the environment, the rural poor, and on women, and the need to find ways to ensure this is carried out;
- the need for greater urgency for and viability of research on the soil and water aspects of natural resources management, given the fundamental importance of soil and water to sustainable production systems;

- the need to increase both collaboration among centers and linkages with other actors in the global agricultural research system, including NARS, NGOs, the private sector, ARIs, and non-CGIAR centers;
- reaffirmation of the importance of an integrated approach to agricultural production and environmental conservation;
- the need for a review of systemwide programs, although this should not limit the consideration of new initiatives; and
- the importance of obtaining an overall balance in the way resources are deployed in order to protect the key elements of the research agenda.

The essence of these priorities and strategies is a concentration on poverty alleviation and protecting the environment through greater collaboration, both inside and outside of the CGIAR system, and a comprehensive, highly developed research agenda. In 1995 expenditures on the research agenda were as follows: increasing productivity, 47 percent; protecting the environment, 16 percent; saving biodiversity, 10 percent; improving policies, 9 percent; and strengthening NARS, 18 percent.

G O V E R N A N C E

An important development in the period under review was the establishment of an Impact Assessment and Evaluation Group, which was proposed as part of the renewal program. The three-member IAEG was set up as an independent unit to secure comprehensive information on the impact of the CGIAR as a system, in close collaboration with the centers, TAC, and partner institutions.

The IAEG's terms of reference are to:

- facilitate strengthening of *ex post* impact assessment capabilities;
- provide guidance and oversight to impact assessment activities and recommend appropriate actions by the CGIAR and/or the centers; and

- ensure the design and conduct of evaluations which document the impact of the CGIAR as a system.

Core strategies of the IAEG are aimed at strengthening evaluation capability, facilitating learning from evaluation studies, and improving the measures of accountability in the system. Evaluation throughout the CGIAR system is to become part of its culture rather than a periodic exercise. CGIAR programs and activities will be evaluated to ascertain strengths and weaknesses to increase the system's effectiveness. Through evaluation procedures, members, NARS, and other stakeholders will be able to assess the impact of their investments. Greater accountability will result from better evaluation. To encourage learning, the IAEG seeks to identify ways to improve all aspects of CGIAR operations.

To attain its goals, the IAEG has decided on a workplan whose first step will be to formulate an evaluation strategy, together with TAC, to develop an evaluation culture. The second aspect will be to encourage the formation of effective evaluation networks throughout the CGIAR. Third, the IAEG will foster and commission studies assessing the CGIAR system from several perspectives.

The IAEG has high expectations for the CGIAR's future performance based on its impressive record and its commitment to excellence in the future. The IAEG expects to lead efforts to make the system more efficient by ensuring that centers know how to undertake evaluation and impact assessments, resulting in high quality analysis. Impact studies will be accessible to members to show the valuable contributions being made by the CGIAR. The IAEG expects to see evidence of improved centers with a range of working alliances as a result of the impact studies. According to IAEG projections, impact assessment analysis will be recognized as a key component of priority setting for the future.

F I N A N C E

The CGIAR is financed by contributions from its members. Industrial countries, specifically the members of the Development Assistance Committee of the OECD, account for more than two-thirds of CGIAR financing. As CGIAR contributions are financed from aid budgets, annual trends in total aid disbursements, or Official Development Assistance,

provide one of the more relevant indexes for describing the CGIAR's external financial environment.

In 1995 ODA amounted to \$59 billion, some \$0.2 billion less than the 1994 level, and the Gross National Product of DAC countries rose by about 10 percent. Therefore, the aggregate ratio of ODA to GNP in DAC countries declined from 0.30 percent in 1994 to 0.27 percent in 1995. In its preliminary report on the financial flows to developing countries in 1995, the OECD noted that the 1995 ratio was the lowest that had been recorded since the United Nations adopted a target of 0.70 percent in 1970. The OECD continues to project a dim outlook for ODA. In this environment, it is noteworthy that support to the CGIAR remained stable. Support by CGIAR members to the 1995 research agenda represented 0.46 percent of ODA, the same level as in 1994, but higher than the average of 0.41 percent achieved in 1991 to 1993.


The targets of the financial stabilization program, which underpinned the CGIAR's eighteen-month program of renewal, were met in 1995, resulting in: full funding of the 1995 research agenda; sufficient additional funding to fully utilize the remaining \$10 million of the World Bank's exceptional support (\$10 million had also been drawn on in 1994); and enhancement of the stability, predictability, and transparency of the CGIAR's financing arrangements. A temporary setback, however, was suffered in early 1996, as a result of uncertainties about funding for the 1996 research agenda. As approved at ICW95, the 1996 research agenda required support of \$300 million. At MTM96, however, underfunding of the research agenda by some 6 percent was anticipated, although funding was available for projects outside of the agreed agenda.


In his opening statement at MTM96, Mr. Serageldin urged the CGIAR to take action to resolve the funding shortfall in 1996, and to reverse the perverse incentives motivating centers that were at the root of this problem. Ensuing discussions by the Group focused on measures to close the funding gap in 1996 and to modify financing arrangements to create positive incentives to avoid a recurrence of a funding crisis.

Two measures were used to close the funding gap: redefinition and or reclassification of funding; and the provision of additional resources by members, in particular by Denmark, as well as by Japan, Australia, and France.

In addition, modified financing arrangements to create positive incentives for centers and to avoid future crises were adopted at MTM96. The modified financing arrangements: allow flexible planning by centers to respond to new opportunities; provide incentives to centers to expand funding for the agreed agenda; bring realism into CGIAR planning; and streamline processes and decisionmaking, thereby reducing unnecessary paperwork by the centers and by TAC.

Centers were given full responsibility for developing their individual financing plans, subject to TAC's certification of their proposed activities, thereby decentralizing CGIAR financial planning and basing it squarely on center projections. World Bank support was shifted from partial gap filling to reinforcing membership support. A new, albeit small, scheme of competitive grant funding was instituted, to be allocated based on TAC recommendations. The purpose would be to foster innovation and inter-center collaboration. A provision for a systemwide reserve was established.

At the same time, mechanisms were established to ensure that the process of decentralization does not jeopardize the overall priorities of the CGIAR as approved by the membership. Specifically, TAC's critical role in priority setting and resource allocation was reaffirmed, to ensure the continued integrity of the CGIAR system and the pursuit of high-value science opportunities. The content of the center programs following the development of their financing plans will be subject to TAC's certification of their proposed activities. Members will take on the role, traditionally assumed only by the World Bank, of ensuring that individual funding decisions do not compromise high-priority activities of the CGIAR system as a whole. 



*F*OR THE FIRST TIME, LANDRACES OF THE AFRICAN RICE SPECIES *ORYZA GLABERRIMA* HAVE BEEN SUCCESSFULLY CROSSED WITH ASIAN RICE *ORYZA SATIVA* TO CREATE NEW UPLAND RICES. THE PROGENY OF THESE CROSSES, BRED BY WARDA, CAN SUPPRESS WEEDS AND RESIST STRESSES, THANKS TO THEIR AFRICAN PARENTS, WHILE GENERATING HIGH YIELDS, A TRAIT INHERITED FROM THEIR ASIAN PARENTS. THEY ARE ALSO LOW-MANAGEMENT, ELIMINATING THE NEED FOR HERBICIDES, WHICH IS IMPORTANT TO FARMERS IN WEST AFRICA'S TRADITIONAL, LABOR-LIMITED RICE PRODUCTION SYSTEMS.

Financial Highlights

CGIAR members support centers and programs of their choice, and each center directly receives and spends funds. Thus, the CGIAR financial outcome discussed here is consolidated from the financial results of the sixteen independent CGIAR centers. The results are reported in US dollars. CGIAR financial highlights for 1991 to 1995 are shown in Table 1. Further details are provided in the *CGIAR 1995 Financial Report*, a separate publication available from the CGIAR Secretariat.

Table 1. CGIAR Research Agenda: Financial Highlights, 1991-1995
(in \$ million)

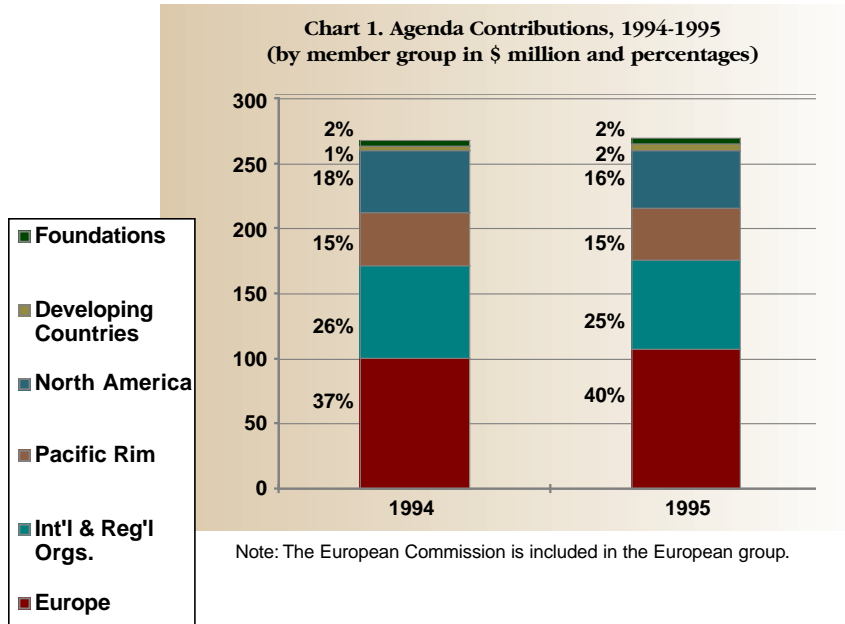
	1991	1992	1993	1994	1995
A. RESOURCE SUMMARY (\$)					
CGIAR Contributions	231.9	247.3	234.7	268.1	269.6
Annual Change (%)	-1%	7%	-5%	14%	1%
Other Revenue	18.5	16.1	6.9	11.7	14.9
Total Revenue	250.4	263.4	241.6	279.8	284.5
System Expenditure					
Operations	248.4	258.7	254.1	264.7	286.0
Capital					
Total Expenditure	248.4	258.7	254.1	264.7	286.0
Annual Change (%)		4%	-2%	4%	8%
Agenda Funding, % of total	80%	78%	75%	82%	82%
% CGIAR Funds Unrestricted	84%	82%	83%	76%	77%
# Contributing CGIAR Members	39	36	38	40	41
CGIAR Contributions as % ODA	0.41%	0.41%	0.42%	0.45%	0.46%
B. EXPENDITURE SHARE PROFILE (%)					
CGIAR Undertakings					
Increasing Productivity		49%	48%	46%	47%
Protecting the Environment		11%	14%	15%	16%
Saving Biodiversity		8%	6%	9%	10%
Improving Policies		10%	10%	10%	9%
Strengthening NARS		22%	22%	20%	18%
Regions					
Sub-Saharan Africa	43%	39%	37%	39%	39%
Asia	29%	33%	34%	32%	32%
Latin America and the Caribbean	15%	16%	15%	18%	17%
West Asia and North Africa	13%	12%	13%	11%	12%
Objects					
Personnel	58%	57%	59%	56%	55%
Supplies/Services	28%	30%	28%	31%	31%
Travel	6%	6%	6%	6%	7%
Depreciation	8%	7%	7%	7%	7%
C. CGIAR STAFF (#)					
International Staff	882	973	957	888	880
Support Staff	10,915	11,041	9,981	9,843	9,498
Total Staff	11,797	12,014	10,938	10,731	10,378
D. CGIAR FINANCIAL INDICATORS					
Total Assets (\$)	405.9	436.3	435.8	468.7	473.1
Net Fixed Assets (\$)	214.5	215.7	220.8	211.0	217.6
Operating and Other Funds (\$)	42.3	44.6	42.5	47.6	53.1
Capital Fund (\$)	11.8	26.3	37.1	50.4	46.2
Current Ratio	1.6	1.6	1.7	1.8	1.9
Memo notes:					
Centers' Cost Deflator (1995 = 1.00)	0.95	0.90	0.91	0.95	1.00
1995 Estimated Total ODA, in \$ billion	56.7	60.8	56.4	59.2	59.0
Capital Investments (\$)		24.5	27.0	19.8	28.8

1995 CONTRIBUTION PROFILE

Contributions from members in support of the agreed research agenda, which comprises the bulk of CGIAR center projects and activities, totaled \$270 million in 1995. Forty-one members, including two new members—Egypt and Iran—contributed to the CGIAR research agenda. These members can be placed into four distinct groups: industrial countries (19); developing countries (9); foundations (2); and international and regional organizations (11). For analytical purposes, industrial countries can be further subdivided along geographical lines into three subgroups: Europe; North America; and the Pacific Rim. It should be emphasized, however, that, as contributions to the CGIAR are voluntary and each CGIAR member has the freedom to decide which centers to support and at what level, the trends emerging from any of the groupings should not be interpreted as policy decisions by the group concerned.

As shown in Chart 1, contributions to the agenda in 1994 and 1995 by member groups indicate a decline in the North America group, while both the European and developing countries groups expanded their shares, reflecting special efforts by individual members to contribute to the financial stabilization program in 1995. Some of these members—Denmark, Norway, and Belgium—had also made a special effort in 1994, while others—India, Mexico, and new members Egypt and Iran—provided funds in 1995. Through the efforts of the latter group, contributions by developing countries increased by over 61 percent from 1994, increasing their share of the total from 1 percent to 2 percent. Other sources of incremental funds in 1995 were Finland, Luxembourg, and the Netherlands. In addition, the agenda was also supported in 1995 by the redirection of funds from complementary activities by the major traditional providers of such support, including Australia, the Netherlands, and the European Commission.

The support provided by the top ten contributors to the CGIAR in 1995 funded about three-quarters of the research agenda. Their contributions are illustrated in Chart 2. Japan was the largest contributor after the World Bank. Also notable is that Denmark became, for the first time, one of the top ten contributors.



DISBURSEMENT SCHEDULE

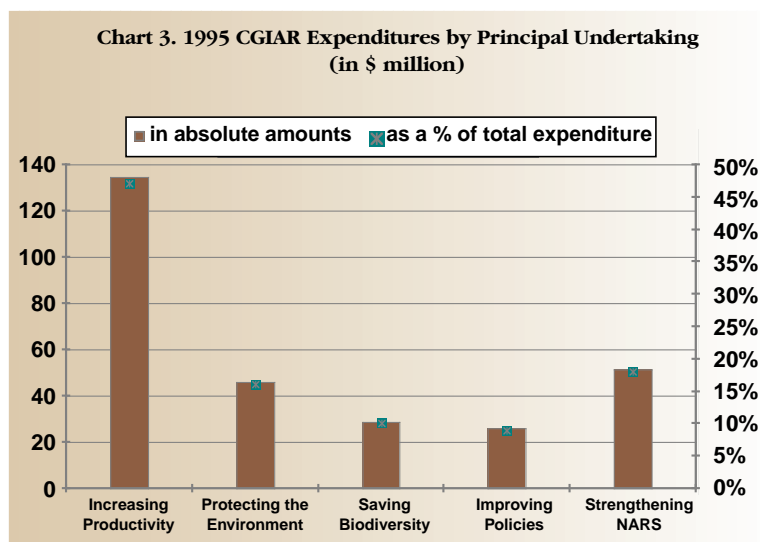
The 1995 disbursement schedule marked progress toward the disbursement targets set under the stabilization program—50 percent of commitments disbursed in January and the balance by mid-year. Several members—Austria, the Ford Foundation, the Arab Fund for Economic and Social Development, and UNDP—accelerated their schedule from the second to the first half of the year, thus boosting the system's disbursement profile by 10 percent, to 43 percent during the first half of the year. The improvement continued in the second half of the year, with France and Japan disbursing their contributions, hence, by the end of the third quarter, over 75 percent of contributions had been disbursed.

ALLOCATION OF AGENDA SUPPORT BY THE CENTERS

The allocation of resources in support of the research agenda is reviewed below from three perspectives: by CGIAR activity; by region; and by object of expenditure.

By CGIAR Activity

Chart 3 illustrates 1995 expenditures by the five principal CGIAR activities or undertakings: increasing productivity; protecting the envi-



ronment; saving biodiversity; improving policies; and strengthening NARS. The overall distribution of resources does not indicate significant shifts in 1995, but confirms recent trends. Investment in “increasing productivity” continued to be the primary thrust of CGIAR activities, with crops the major focus, accounting for 73 percent of investments, followed by livestock at 18 percent, forestry at 8 percent, and fish at 2 percent. Investments in “protecting the environment” and “saving biodiversity” continued to increase in 1995. Investment in “strengthening NARS” declined; however, there was a shift within this activity area, with training receiving more resources at the expense of information and documentation activities.

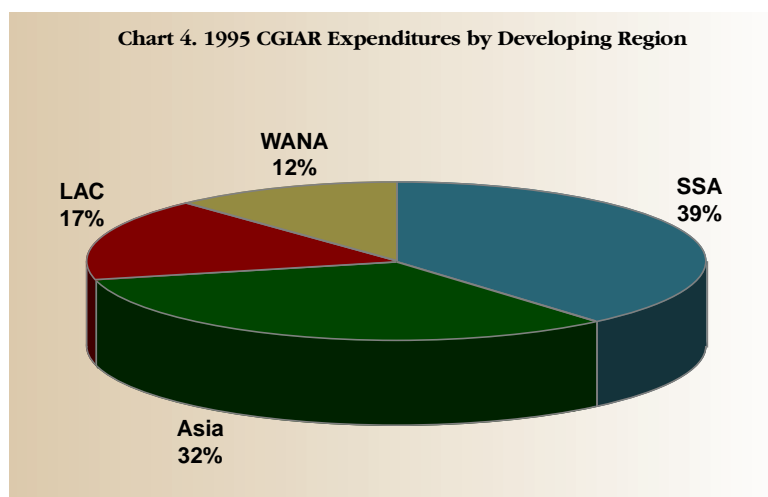
By Region

The 1995 allocation of CGIAR resources by the developing regions of the world is shown in Chart 4 [see page 38]. CGIAR expenditures on research targeted to Sub-Saharan Africa continued to increase in dollar and percentage terms in 1995, consistent with the *Lucerne Declaration*. Although investments for other regions stabilized in percentage terms, they continued to increase in dollar terms for all regions except West Asia and North Africa. Almost all centers had activities aimed at Sub-Saharan Africa in 1995, with four centers—IITA, ILRI, ICRAF, and ICRISAT—accounting for over two-thirds of the resources committed. The pattern was similar in Asia. A majority of the centers carried out activities in Asia in 1995, and four centers—IRRI, ICRISAT, CIMMYT, and CIP—accounted for the bulk of the investments. On the other hand, over two-thirds of the investments made in WANA continued to be made by ICARDA, while CIAT accounted for about half of the investments made in Latin America and the Caribbean.

By Object of Expenditure

The trend in reduced spending on personnel continued in 1995. While actual dollar amounts spent on personnel increased in 1995, the rate of increase in spending was lower than the overall spending rate. This was also confirmed by staffing numbers, which continued to decline in absolute terms for both internationally and nationally recruited staff. Personnel costs amounted to 55 percent of total spending in 1995, compared to 56 percent in 1994, and an average of 58 percent from 1991 to 1993. These developments are indicative of the

continuing trend at centers to control spending on personnel as a measure to increase financial flexibility in an increasingly volatile aid environment. Spending data for 1995 also includes one-time costs associated with staff separation for several centers. There were no significant changes in expenditures on supplies and services, travel, and depreciation in 1995.




1996

FUNDING ISSUES AND THEIR RESOLUTION

At the commencement of the CGIAR's 1996 Mid-Term Meeting, there was widespread concern over three interrelated developments pertaining to financing of the 1996 research agenda. First, the 1996 agenda, which required support of \$300 million as approved at International Centers Week 1995, was expected to be underfunded by some 6 percent, or approximately \$20 million, while some \$47 million in funding remained outside of the agenda in support of complementary activities. Second, the shortfall in funding for the research agenda was unevenly distributed among centers, placing several centers at risk due to insufficient funding in 1996. Third, the World Bank's matching contribution was placed in jeopardy as a consequence of the shortfall, raising the possibility that a refund of part of the Bank's contribution would be required. Consequently, discussions at the Mid-Term Meeting on the CGIAR's

financing arrangements were focused on proposed measures to close the funding gap in 1996 and to modify financing arrangements to create positive incentives to avoid a recurrence of funding gaps in future years.

Two measures were employed to close the funding gap in 1996. First, approximately \$15 million of funding for complementary activities consistent with the agreed research agenda were redefined and/or reclassified in support of the agreed agenda. Second, members mobilized additional resources at a level of about \$5 million for centers facing the most serious funding shortfalls. This included an exceptional effort by Denmark, in particular, as well as efforts by Japan, Australia, and France. Additionally, reserves previously set aside were partially drawn down and the centers concerned curtailed spending. These measures closed the funding gap in 1996 by ensuring about \$300 million in funding and full access to the Bank's matching contribution. 



*T*O HELP MANAGERS MAKE THE MOST OF DIVERSITY IN THE WORK-PLACE, ISNAR PUBLISHED A RESEARCH REPORT IN 1995, BASED ON ITS STUDY, BEGUN IN 1993, OF FOUR AGRICULTURAL RESEARCH INSTITUTES IN THE PHILIPPINES. ENTITLED "WOMEN SCIENTISTS AND MANAGERS IN AGRICULTURAL RESEARCH IN THE PHILIPPINES," THE STUDY LOOKS AT WHY THERE HAS BEEN SUCH A DRAMATIC INCREASE IN THE NUMBER OF WOMEN IN AGRICULTURAL RESEARCH IN THAT COUNTRY AND DOCUMENTS PRACTICES THAT HAVE HELPED MANAGERS TO ENSURE CONTINUITY IN THEIR RESEARCH PROGRAMS, WHILE SUPPORTING FLEXIBLE SCHEDULING.

Gender and the CGIAR: Inquiry, Progress, and Challenge

Hilary Sims Feldstein
Leader for Gender Analysis

Deborah Merrill-Sands
Leader for Gender Staffing

CGIAR Gender Program

INTRODUCTION

International Centers Week 1995 was the occasion for the CGIAR Gender Program to make a presentation on its achievements over the past few years and frameworks for future action. In the context of the Fourth World Conference for Women in Beijing, China and the renewal of the CGIAR, Dr. Agnes Quisumbing (IFPRI), who represented the CGIAR in Beijing, highlighted four critical areas of concern to which CGIAR research could contribute:

- poverty and women;
- inequality in economic activities and access to resources;
- inequality between men and women in the sharing of power and decisionmaking at all levels; and
- inequalities in the management of natural resources and safeguarding the environment.

Three central themes of the renewal of the CGIAR furnished the points of linkage with the Beijing platform:

- the move to open the CGIAR to a wider range of partnerships;
- the integration of CGIAR perspectives with those of the international development community; and
- the refocusing of research on the nexus of agriculture, the environment, and poverty as the basis of nurturing sustainable agriculture for food security in developing countries.

The CGIAR Gender Program is helping to address the concerns raised in Beijing and incorporated in the refocused vision of the CGIAR. The program, which was launched in 1991, was built on the recognition that women constitute over 50 percent of the rural poor, that in all regions women play a significant role in agriculture and natural resources management, and that the growing number of women scientists and other professionals was creating a pool of excellence little tapped by the CGIAR centers. The program aims to

increase the effectiveness and efficiency of international agricultural research by:

- strengthening the use of gender analysis in research aimed at technology development and in training for developing country researchers, to ensure that the agricultural enterprises and operations of women, as well as of men, are fully considered when defining research problems and setting priorities; and
- improving the conditions and mechanisms within the centers for promoting the recruitment, productivity, advancement, and retention of highly qualified women scientists and professionals.

The program was developed in consultation with the CGIAR Center Directors and boards and has been funded by Australia, Canada, the Ford Foundation, the International Development Research Centre, the Netherlands, Norway, Switzerland, the United Kingdom, and the United States. By making the gender program an explicit part of the system and putting resources behind it, the CGIAR took a major step forward.

HISTORY

There were a number of CGIAR antecedents to the current attempt to address gender issues systemwide. In 1982 IRRI held a conference dedicated to understanding the roles of, and impact on, women in rice farming. The conference led to a set of recommendations for greater attention to women's roles in agriculture and for becoming the catalyst for the Women in Rice Farming Systems (WIRFS) program at IRRI. As part of the wide-ranging impact study conducted in 1984 and 1985, Dr. Janice Jiggins was commissioned to address gender issues.

In 1985 ISNAR and the Rockefeller Foundation hosted a Bellagio meeting on "Women and Agricultural Technology: The Users' Perspective in International Agricultural Research." The conference made a number of recommendations about the importance of addressing gender issues and including women in technology development, the complementarity between centers and NARS in such work, and the importance of including more women in center training. Also in 1985, the WIRFS program was inaugurated at IRRI, a program which provided, for ten years, research, training, and conference activities focused on developing the capacity of

national scientists to use gender analysis in agricultural research. Under the WIRFS program, the knowledge gained on “who does what” provided the means to identify and give priority specifically to women’s productive activities, thereby addressing equity as well as efficiency concerns.

In 1986 the publication of the Jiggins report presented further evidence of how gender should be taken into account in agricultural research, specifically focusing on varietal characteristics, production, and domestic processing. Neither the Bellagio conference nor the study by Dr. Jiggins provided for or led to a systemwide commitment or mechanism to implement recommendations. Decisions about whether and how to address gender concerns were left to individual centers.

There were two sets of activities outside of the CGIAR which further built the case. In 1984, with support from the Rockefeller and Ford Foundations, farming systems practitioners and gender experts met at Bellagio to discuss “Understanding Africa’s Rural Households and Farming Systems.” Also in 1984, the Population Council and the Farming Systems Support Project (University of Florida) initiated work to develop a set of training case studies on gender analysis in agricultural research. The conceptual framework for identifying the intersect between gender and agricultural research, published in 1989, furnished clear and practical guidance to agricultural practitioners as to what specific kinds of information and analysis facilitated an improved understanding of women and men as part of the user perspective.

Gender issues received formal attention in the ICW87 seminar on “Gender Issues: User Impact, Agricultural Technology, and the Global Agricultural Research System.” Again, the lack of systemwide follow-up led to increased concern by those knowledgeable in the field that the CGIAR was missing an important population with particular and relevant concerns for its research. The issue came to a head in the further assessment of gender issues in international agricultural research presented by Dr. Susan Poats at MTM90. The presentation laid out clearly the evidence of past CGIAR efforts, the accumulating evidence within and outside of the CGIAR of the relevance of gender analysis to agricultural research, and the unevenness of center attention to the issue. Dr. Poats challenged the CGIAR to provide a systemwide responsibility for monitoring center progress and for assisting centers in learning how to do gender analysis and how to train personnel in gender analysis. The 1990 presentation also

marked the introduction of gender staffing issues into the discussion by highlighting the considerable imbalance between men and women as scientists, professionals, and as trainees within the system.

THE RATIONALE

The impetus to address gender analysis and gender staffing issues came initially through concern for the efficiency and effectiveness of international agricultural research.

Gender Analysis

Gender analysis and the user perspective contribute to the efficiency and effectiveness of technology and policy design, and to fulfilling the CGIAR's commitment to improving productivity, conservation, equity, and welfare. In order to achieve impact, there must be adoption. In order to obtain adoption, users—men and women—must be brought into technology design at the earliest opportunity. Gender analysis is inherent in client- or market-oriented research. That is, by using gender analysis, scientists can identify by gender, age, and other locally relevant variables who are the most appropriate informants and collaborators for research on, for example, specific commodities, livestock, fish, management practices, or natural resource management activities.

By identifying the right collaborators, scientists are better informed as to current practices, desirable improvements, and the opportunity costs and benefits of specific proposed changes with respect to the division of labor and access to and control of resources and benefits within the farm household. In turn, this knowledge leads to the development of technologies which take account of the farming system and are more likely to be adopted.

The quandary for addressing gender in international agricultural research is how to relate what is usually a location specific phenomenon—the distribution of gender roles—to the work of international centers, whose brief is to produce international public goods. Where is the comparative advantage of centers compared to NARS on this issue? There are at least six specific areas where gender analysis as part of the user perspective and collaboration with farmers has been shown to be relevant to center research:

- in any on-farm work, whether diagnostic or evaluative;
- in methodology development for identifying key questions and means of ensuring male and female farmer participation;
- in including attention to taste and processing characteristics of improved varieties, where women are usually the best informants;
- in identifying key stakeholders with respect to different aspects of natural resources management;
- in collaborative research with and training for NARS and NGOs; and
- in measuring the direct and indirect impact of improved technologies on farm households.

Gender Staffing

Attention to gender staffing relates to concerns about organizational effectiveness and efficiency. It reflects the dramatic increase of women in science and other professions during the past twenty-five years. Whereas women used to have low levels of participation in the agricultural sciences, today women comprise between 20 to 50 percent of the pool of scientists and professionals receiving advanced degrees in the fields from which the centers recruit. To ensure continuation of excellence in staffing, the centers need to ensure that they are tapping into this more diverse pool of talent.

The concern with gender staffing also stems from the growing belief of many managers that a diverse staff contributes to improved organizational performance by broadening the pool of skills, talents, perspectives, and ideas upon which the organization can draw. In addition to these concerns linked to organizational performance, many leaders in the CGIAR believe that the system, with its humanitarian mandate, should set an example and reflect its commitment to equity in its own staffing practices.

PROGRAM APPROACH AND ACTIVITIES

Prior to ICW95, the CGIAR Gender Program went through three phases: (i) diagnosis and planning; (ii) selective support and experimentation prin-

cipally at the center level; and (iii) continuing support and experimentation along with activities aimed at developing mechanisms for institutionalization.

Phase I: Diagnosis and Planning

Center Directors wisely asked that planning for the CGIAR Gender Program be based on further analysis of the situation for gender analysis and gender staffing at four centers selected for their diversity in size, program, and region: CIAT, ICARDA, ICRISAT, and IITA. Conducted in July and August 1991, these diagnostic visits contributed useful insights into decisionmaking about agricultural research and the situation of women professionals in the system. These visits made clear the considerable variability among centers as to how they are organized and managed with respect to program and human resources management. This was not surprising, given the considerable autonomy of the centers in determining and implementing their research programs.

Parallel to the visits, the program conducted the first systemwide human resources survey of internationally-recruited staff. The survey revealed the numbers and percentages of women and men professionals by center, professional category, discipline, education, professional experience, average tenure, and region of origin, and provided available statistics from selected countries and comparable organizations. The results not only aided the diagnosis, but established a baseline from which to measure progress. Systemwide, women comprised 12 percent of total internationally-recruited staff. More specifically, women comprised 10 percent of the internationally-recruited scientists and 17 percent of the nationally-recruited scientists. Women also made up 24 percent of administration and program support staff. Approximately 5 percent (11) of the senior or middle-level managers were women and 10 percent of board members. Women as a percentage of internationally-recruited staff at centers varied from 4 to 28 percent. IITA had the largest number of women (13). Compared with published statistics then available, the percent of women in the CGIAR was a little higher than that of staff of development organizations posted overseas, and lower than the percentage of women in agricultural sciences in the universities of developed countries.

The survey and visits were followed by senior management workshops at ICW91 and ICW92 for Center Directors and senior center administrators. One day each was spent on gender analysis and gender staffing

discussing concepts, evidence, and trends. Each day ended with recommendations by the participants as to how these issues could be addressed at the center, system, and member levels.

Phase II: Selective Support and Experimentation

It was clear from the earlier center visits and the discussions in the senior management workshops that some centers were already working toward improved attention to gender issues in both (or either) analysis and staffing, while others were unconvinced or reluctant to commit resources to these issues. With its available resources, the program could not cope with activity in all centers. The decision was made to be selective, responding to the initiatives of senior managers to help them pursue their important issues.

Since the program could learn from the activities which it supported, it planned to document and publish the lessons learned, and to build from experience to recommendations useful across the system. Thus Phase II had three thrusts: (i) providing services and products available to all centers, or providing systemwide products; (ii) providing center-specific services and products tailored to their individual needs and priorities; and (iii) supporting center-based initiatives with small grants.

During Phase II the emphasis on the gender analysis side was on supporting center initiatives and on examining where gender analysis would improve the client acceptability of the technology and where the centers had a comparative advantage with respect to addressing gender issues. At ICRISAT and IIMI the program worked with center-appointed gender specialists and committees to set up a plan of action and to undertake a center diagnostic. Workshops for center scientists were undertaken at CIP and ICRAF as part of a wider portfolio review of center activities. The workshops were designed to help scientists learn more about the importance and methods of gender analysis and to discuss what further work might be done at their centers. Portfolio reviews were also conducted with ICARDA and IPGRI.

The objectives of the portfolio reviews were to identify: research projects and programs where the centers were already doing gender-related research and training; those projects where gender analysis was relevant to research planning and outcomes, and needed to be addressed; and those—principally upstream—projects where attention to gender would not be expected

to be visible, though the problems being solved might be ones brought to the fore through previous gender analysis. IPGRI followed its initial consultation by taking steps to ensure that the collecting guide then being developed included appropriate references to women and men as informants, and information on postharvest use and desirable characteristics among the data collected. At IITA the program furnished materials and assistance to the training division to integrate gender into their materials and curriculum. A small grant was given to ICARDA for a literature review on women and agriculture in West Asia and North Africa, which was published in early 1996.

On the gender staffing side, initial activities were directed toward attracting more women to the centers and retaining them. This emphasis responded to the relatively low participation of women professionals in the CGIAR system. Priority was given to addressing constraints to spouse employment, which senior managers had identified as their most acute problem, and recruitment. Spouse employment problems have arisen with the growth of two-career families worldwide, the smallness and sometimes restrictive nature of the international centers, which has made appointing two members of a family problematic, and the unavailability of work permits for spouses to engage in professional opportunities in many developing countries. While affecting both men and women, spouse employment constraints have a differentially negative impact on women, who are more likely than men to have a professional spouse.

To define the problem more concretely, a detailed case study of constraints on and opportunities for spouses to engage in professional activities was carried out at IRRI. This was complemented by a comparative study of a number of progressive scientific and technology development organizations to identify best practices in this area. An important finding was that these organizations all saw addressing spouse employment constraints as central to their ability to compete for high quality staff in the international market. They gave priority to understanding and cultivating the options available in a particular setting and communicating these effectively to candidate scientists and their spouses. With support from the Gender Program, ICRISAT used this idea to draw on the expertise of current spouses to: identify spouse skills and needs; and identify employment and learning opportunities and services, such as electronic mail, that ICRISAT could render to spouses. This created a base from which ICRISAT could employ spouses and could make available better knowledge of options to potential employees.

To better understand the recruitment situation, a survey was carried out in all centers. This was complemented by in-depth analysis of recruitment practices at four centers: IRRI, IIMI, ICRISAT, and IFPRI. The diagnosis showed that application rates from women for international staff positions were very low, averaging 4 percent. In response guidelines on best recruitment practices and inventories of recruitment resources in the United States, Europe, and the Philippines were published for broader use by the system.

At IITA, where the percentage of women among the professional staff was highest in the CGIAR system, the program was invited to broaden its perspective and work with the center to examine how the workplace differentially affects the advancement, job satisfaction, productivity, and retention of men and women professionals. This resulted in a center-wide workshop aimed at helping IITA to strengthen internal collaboration and communications and develop mechanisms and practices to more effectively harness the contributions of its diverse staff.

During this phase the gender staffing program also conducted a survey of women employed at the centers to better understand their experiences and their priorities for support from the program. To strengthen the participation of women in management, the program began to support women to attend the annual CGIAR Management Training Course. So far eleven women have received funding to attend the course. The program also gave a small grant to ISNAR to help fund a study on management issues affecting women professionals in the national agricultural research system of the Philippines, where, unlike the centers, women comprise 50 percent of the research staff.

Phase III: Continuing Support and Experimentation, and the Development of Mechanisms for Institutionalization

Beginning in early 1994, while continuing to give support to earlier types of activity, increased attention was given to mechanisms for institutionalizing attention to gender analysis and gender staffing at individual centers and in the system.

During this phase the gender analysis program supported follow-up activities building on earlier initiatives at ICRAF, ICRISAT, IITA, and IPGRI. For IITA and ICRISAT the program engaged extensive portfolio reviews or

gender audits. ICRAF focused on improving its training materials, for use in its own training courses, and by faculty of post-secondary institutions attending the training; therefore, the materials likely had a widespread effect on the standard training of agricultural and agroforestry personnel. A small grant was made to IPGRI for a publication on women and plant genetic resources entitled *The Forgotten Farmer* (1995).

As another strategy to increase center awareness of the best gender-related research in the system, and to make it visible to the wider interested audience, two impact publications were published. The first, *Partners in Selection: Bean Breeders and Women Bean Experts in Rwanda*, was based on work at CIAT. The second, *From Field to Lab and Back: Women in Rice Farming Systems*, was based on IRRI's program. The gender program also compiled an inventory of all the gender-related research and training in the system between 1990 and 1995, a total of 140 projects. While this is a small number given the overall dimensions of CGIAR research, it shows progress since 1991 and provides a benchmark for future assessments.

One of the difficulties for center researchers interested in gender, or more broadly in the social sciences, is keeping in touch with each other and with the wider world of research in this area. To promote a vehicle for better communication and discussion, the program made a grant to IFPRI to inaugurate an open electronic-mail list, <gender-cg>, which currently has 250 members from twenty-nine countries, including forty from the CGIAR. In addition, IFPRI hosted an e-mail conference on gender and property rights—land, water, and trees—in a combination of mailed copies of presented papers and e-mail discussion of each. The conference made clear the breadth and complexity of property rights for each of these areas, and that women's rights were usually much less than men's rights, with negative effects on their productivity and interest in investment.

On the gender staffing side, emphasis shifted from systemwide products providing new information and ideas to the centers, to supporting the centers in their efforts to apply new approaches and mechanisms. A consultant worked closely with IRRI in revamping its recruitment procedures. Comparative data on 1992 and 1994 IRRI recruitments show the benefits of a more proactive approach to increasing the number of women candidates. In 1992, out of 399 applications for eight positions, 5 percent were

women, whereas in 1994, with about the same number of applications for eight positions, the rate of women applicants had jumped to 15 percent. Similar results were documented at IFPRI, where the monitoring process showed that efforts to “cast the net widely” also increased applications from men and women in developing countries. The gender staffing program also supported searches for scientific and managerial positions in CIAT, CIFOR, CIMMYT, ICRAF, ICRISAT, IIMI, IPGRI, and ISNAR. On spouse employment, the program organized a workshop with the Committee of Board Chairs, and has continued to monitor and review progress with the Committee of Deputy Center Directors.

To increase the visibility of the CGIAR, the program published articles in professional newsletters aimed at women, contacted women’s committees in professional societies, and distributed information about women in the centers to key women professionals in the disciplinary areas most relevant to the centers.

With healthy progress made on recruitment and spouse employment, the gender staffing program turned to considerations of the workplace environment. A substantial collaboration was undertaken with the IFPRI Gender Committee. The consultants conducted extensive interviews with IFPRI staff, which focused on three key questions: (i) differential impacts of workplace structure, policies, and practices on women and men; (ii) whether men and women have different values or approaches to work and whether some of these are more highly valued by the organization than others; and (iii) how people structure their time and balance work and family responsibilities. The aim was to identify leverage points for change which would improve both organizational performance and make the workplace more supportive of the productivity and job satisfaction of both men and women. The results of the interviews were consolidated and reflected back to IFPRI, followed by roundtable brainstorming by IFPRI staff on how to address the issues raised.

The analysis suggested several key leverage points. First, countering a tradition of individualism, IFPRI saw that it needed to strengthen its support for collaborative research. This type of research was becoming increasingly important in IFPRI’s strategy and was also highly valued by many of the women staff. Second, it was concluded that IFPRI’s reward and recognition systems needed to give more prominence to work that is often described as “invisible” within the organization, but is important to IFPRI’s mission and to many of the women and staff from developing countries. This type

of work includes outreach activities, capacity building, and applying research results to policy development in specific countries.

A third leverage point highlighted was finding ways to reduce extreme time pressures experienced by staff. Given multiple demands on staff time for activities such as fund raising, administering projects, and participating in collaborative projects, many researchers felt that too much of their “real” research was being relegated to off hours. This problem was felt most by men and women who had family responsibilities and for whom time is not infinitely expandable. IFPRI has now embarked on several organizational experiments to strengthen the organization in these areas. These include: the introduction of “quiet time”—designated periods when staff do not interrupt one another or schedule meetings—and “flex time”; guidelines for joint authorship to strengthen collaboration; skill-building in facilitation techniques to improve communications; and, an ongoing process to develop a shared vision among staff and managers for the center.

In preparation for the assessment and recommendations to be presented at ICW95, separate consultations for gender analysis and gender staffing were held with managers and senior scientists and professionals from the centers and with selected board members. The meetings confirmed real progress on both fronts in a number of centers, and recommended continuation of the program and specific actions. The recommendations offered a strong basis for the framework for action presented at ICW95.

ASSESSMENT AND FRAMEWORKS FOR ACTION

Key elements of the strategy used to develop the program over the past four years have been to:

- cultivate awareness and develop commitment by linking work on gender systematically to the strategic objectives of the centers;
- respond to the priorities set by the Center Directors;
- target resources to those centers where senior managers are committed and initiate requests for support (to date the pro-

gram has worked substantively with eleven of the sixteen centers);

- diffuse lessons learned at these focal centers to other centers in the system through publications, workshops, meetings, and promotion; and
- use the established CGIAR systems, such as reviews and boards of trustees, to reinforce adoption of good practices at centers.

In large measure these strategies will continue to guide the program through 1998.

Gender Analysis

Since the inception of the gender program in 1991, centers have:

- included consideration of gender in research review documents and process (3);
- hired gender specialists (4);
- conducted portfolio reviews of their program (5);
- held training for their own staff (3);
- incorporated materials into their training programs (4); and
- engaged in an increasing amount of gender-related research and training.

These achievements add up to progress in center and scientist awareness and activities, but the advances made are fragile and not yet systematic.

A better understanding of the constraints to using gender analysis has emerged from the experience thus far. First, for center scientists—usually trained in a technical discipline—understanding and using the results of gender analysis to further their work is a challenge. The experience of many organizations seeking to incorporate a gender perspective has shown that it is usually the opportunity to work with gender in one's *own*

program or commodity or region that allows people to learn the value of gender analysis for their work.

Second, some of the reluctance stems from the fact that knowing what women do is not always the most important variable affecting the research. Nevertheless, identifying who is the most relevant collaborator continues to be important. Third, the responsibility for gender analysis and user perspective is necessary for a portion of CGIAR scientists and NARS and NGO scientists who are in the front line of directly addressing farmer needs.

For the future there are three avenues through which gender analysis will be used and supported throughout the system. First, the CGIAR gender program will continue to support some center initiatives and will take the lead in providing communication between centers and scientists on best practice, providing training and other materials. It will also provide systemwide coverage in terms of monitoring the progress of gender analysis and providing guidance to external program reviews and support to the CGIAR in identifying gender-related priorities for research, and tracking the use of gender analysis in center research, training, and dissemination activities.

Second, in early 1996 CIAT, CIMMYT, and IRRI sponsored a systemwide initiative, which had been approved by TAC, on participatory methods and gender analysis. This initiative focuses on methodology development in these two important areas in the context of developing improved varieties and of natural resources management. The early research will be conducted as part of ongoing research at a projected eight sites, where centers are currently conducting research in collaboration with NARS or NGOs. The research is in an experimental mode. A comparative framework will be established for conducting the research and deriving guidance as to what works at what levels of agricultural research.

In addition, researchers will be trained in appropriate methodologies in order to carry out the research and provide the data necessary to assess the effectiveness and relevance of different approaches. Annual workshops will report results to a wider audience of CGIAR, NARS, and NGO practitioners. Once there is confidence in the methods and their most appropriate uses, training and materials will be made available to the wider group. This center-based initiative will capture most of the methodological development and capacity-building thrusts of the gender analysis program and is seen as the eventual home for these aspects of the gender program.

Third, at ICW95 the CGIAR made clear that the productivity and welfare of poor rural women should be a priority. There is a growing concern about directly addressing constraints specific to women's agricultural production. This more proactive approach derives from the abundant evidence of not only women's extensive engagement in agriculture, but their important roles in natural resources management and the use of those resources, particularly for fuel and water. It is also generated by an increasing number of empirical studies showing that resources and income going to women are more likely to be spent for the benefit of all family members, than equal or greater amounts going to men. Center plans for addressing this mandate are to be included in their upcoming medium-term plans for 1998 to 2000. The gender analysis program will work with centers to set up dialogue with NARS and NGO partners on how best to address this. In addition to participatory breeding and natural resources management, gender analysis will be relevant to other emerging themes within the CGIAR, such as: adoption and impact studies; policy concerns on resource tenure; *in situ* conservation of biodiversity; and understanding the extent and pattern of the feminization of agricultural production.

To carry out this plan for action, recommendations were made at ICW95 for the continuation of the gender analysis program to 1998, with a central program to coordinate and implement activities, resources to provide technical assistance, and small grants in response to center initiatives. Much of this will be done in collaboration with the systemwide initiative. There will also be a working group of gender focal points, annual reports to TAC and the Committee of Deputy Center Directors, assistance to external program reviews, and continuation of an e-mail network for communication and publication of innovative cases.

Gender Staffing

The work of the first four years has sought to increase the participation of women in the centers. Good progress has been made, although, as with gender analysis, the gains are fragile and not yet institutionalized. From a quantitative perspective, a second Human Resources Survey administered in early 1995, based on 1994 data, showed that the number of women in internationally-recruited positions increased 19 percent since 1991, even at a time of financial stringency, when the cadre of international staff of the CGIAR system grew only 1 percent. Women now comprise 14 percent of internationally-recruited staff, compared to 12 percent in 1991, and 31 per-

cent of nationally-recruited staff, compared to 18 percent in 1991. The proportion of women serving on center boards of trustees jumped from 10 percent to 17 percent, and the percentage of women among managers has increased to 8 percent. The percentage of women post-doctoral fellows and graduate trainees has reached 25 percent, a level which is about equal to the supply. The percentage of women among senior scientists, however, has remained constant at 10 percent.

From a qualitative perspective, looking at the organizational changes that have taken place, progress has also been substantial. More than half of the centers have adopted new policies and practices for reaching women more effectively in recruitment for international positions and fellowship and training opportunities, and for ensuring fair review and selection procedures. As a result, the average application rate of women to international positions across the centers rose to 11 percent in 1994. Applications from women in developing countries remain disproportionately low, however. With respect to spouse employment, most centers have adopted more flexible policies for hiring suitably qualified spouses within the centers, and about a third have introduced the means to systematically assist spouses to find professional opportunities outside of the centers.

In the future the system will continue to build on the experiences gained in recruitment and spouse employment. The gender staffing program will give priority to disseminating good practices across the system, tapping more effectively into networks of women professionals in the South, and supporting efforts of centers that have not been as successful in attracting female candidates. To strengthen networks with women professionals in developing countries, the program has begun to collaborate with the Third World Organization for Women in Science.

The main focus of the gender staffing program in the future, however, will be on gender issues in the workplace—working on factors that affect the productivity, job satisfaction, professional development, and retention of both male and female staff. This is a much more complex area of work, particularly in a multicultural environment. It relates to the core management systems, the values and reward systems that drive behavior, the way work is organized, and leadership and management styles. These aspects of an organization can have a gender dimension in that they can privilege certain behaviors, skills, and ways of working, while they can minimize others.

So far two centers—IFPRI and CIMMYT—are actively working on gender issues in the workplace with support from the program. The program expects to collaborate with two more pilot centers over the next three years. The program will help these pilot centers to learn from each others' experiences and will disseminate lessons learned to the other centers. This line of work is much more developmental and intensive than the earlier work on recruitment and spouse employment, and experiences from other organizations upon which the CGIAR system can draw are limited. Consequently, the program has adopted a "collaborative action research" mode of working with the centers in which both the program and the centers are learning in the process. The program has also linked up with consultants and practitioners involved in similar action research projects on gender in the workplace being carried out in both public and private sector organizations. While this area of work is more experimental, it offers great opportunities for the centers to be innovators in this area of organizational development.

With respect to management training for women, the program began experimenting with a new approach in 1996. It helped to fund and organize the first Women's Leadership and Management Course in the CGIAR system. The course, organized by CIMMYT, was attended by twenty-five senior scientists, professionals, and middle-level managers from four centers—CIAT, CIMMYT, CIP, and IFPRI. The participants evaluated the course as very successful both in terms of the skills learned, but also, very importantly, in terms of the professional network they were able to develop with other women in the centers. Given the success of this event, the program will continue to support this type of training in the future.

With the view toward strengthening institutionalization of attention to gender staffing issues in the CGIAR system, the program launched a semi-annual newsletter designed to maintain awareness, facilitate the sharing of experiences and innovations among centers, and highlight good practices from other organizations. In addition, a network of gender staffing focal points, comprising either senior managers or scientists in the centers, has been established across the centers, an advisory panel has been set up as part of the Committee of Deputy Center Directors, and the program is coordinated by the Management Team of the CGIAR Secretariat.

LESSONS LEARNED

Several key lessons have been learned from the experience in addressing gender analysis and gender staffing:

- Mainstreaming gender is a long-term process of organizational change. The change process requires commitment, creativity, flexibility to respond to new and second-generation issues as they arise, and vigilance to stave off complacency.
- For the change to have impact and be sustained, work on gender has to be explicitly linked to strategic objectives of the centers. Staff and managers have to see how it will help them to do their job better and strengthen the performance of their organization.
- Focusing on gender can be a leverage point to improve research management processes, such as priority setting and monitoring and evaluation, and work and management systems, such as recruitment processes or performance reviews.
- To achieve progress at the center level it is essential to have strong leadership from the top, a constituency of staff committed to promoting and supporting change, and a “champion” who is clearly responsible and accountable for making the desired changes happen.
- External support helps to maintain awareness and momentum, encourages monitoring, provides economies of scale, and facilitates access to technical expertise. 🙌

PART *Two*

25 Years—A Commemoration

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*P*ROVIDING ACCURATE INFORMATION ON WATER FLOWS IS ONE OF IIMI'S APPROACHES TO ENSURING THE ADEQUACY, TIMELINESS, AND RELIABILITY OF WATER DELIVERIES TO IRRIGATED AGRICULTURE IN THESE TIMES OF INCREASING WATER SCARCITY.

The Renewed CGIAR: Recommitment for the Future

*Ismail Serageldin
CGIAR Chariman*



Twenty-five years ago, a small group of visionaries met at the World Bank under the chairmanship of Dick Demuth for the first formal meeting of the CGIAR. They were committed to using science and technology to benefit the poor. Their vision has been fulfilled many times over. They continue to be a source of inspiration. We salute their foresight. We honor them and accept the solemn responsibility of continuing to build on the foundation they laid.

Ideally, twenty-five years on, we should be able to declare total victory, fold up our tents, and move on; but development is about life, and life is not like that. We are all familiar with the record of the past, the complexities of the present, and the problems as well as the promise of the future. Let me not repeat data and analyses which are only too well known to you. Let me only restate our common belief that, as Jawaharlal Nehru put it, in development “everything else can wait, but not agriculture.”

If we do not transform agriculture to be more productive, we will curtail food abundance, which is the basis of food security. Low-output agriculture cannot feed growing populations. If we do not transform agriculture to be sustainable, we will destroy natural resources, the foundation of productivity and human sustenance. If we do not transform it to benefit the poorest and focus especially on women, we will help to perpetuate the very inequities we want to dismantle.

Agricultural transformation in the world’s developing regions will require a thrice green revolution: green for productivity; green for environmental sustainability; and green for increased income as the entry point to improved living conditions, dealing with the access side of food security.

I am aware that modern agricultural technologies have their detractors. We would be doing ourselves a disservice if we did not respect their genuine concerns. These are many faceted, ranging from fears that new technologies harm the environment and erode biodiversity to claims that only large-scale, rich farmers benefit from modern, science-based agriculture.

When new agricultural technologies were introduced in Asia, the pre-eminent need was to produce more food, thereby saving millions from starvation or death. This was done. With the cushion of productivity in place, CGIAR policies and programs have evolved into a twinning of productivity-oriented research and natural resources management as the basis of sustainable agriculture. This is fundamental to all our work.

So I would say to our friends whose concerns are with the poor and with the environment: we share identical goals. Our hopes for the future are in complete harmony. We are committed to the new paradigm of development in which cutting-edge science can be combined with traditional knowledge; in which community-based action is recognized as essential for effectiveness; and in which empowerment of farm families, and primarily of women, is paramount. I say to all of you who share these objectives: whatever your present misgivings, come, join us, let us work together for these better tomorrows.

Research is the basis of agricultural transformation. Ours has to be a people-centered research agenda in which the results of research sustain the poor and the hungry. Within that focus, we can dare to dream, and dream again, of what is yet to come; but dreams must be tempered with realism. And realism tells us that we cannot act alone. We must combine forces with, and combine the forces of, a variety of partners in a global research system dedicated to food security, poverty alleviation, and agricultural sustainability.

New and deeper partnerships must be forged in a strong, global research system if all the building blocks are to fit together in a durable construct. Farmers and other resource users must have a much stronger voice in setting research priorities, the conduct of research programs, and the evaluation of research results. Research teams in universities and other advanced research organizations must be better mobilized by traditional agricultural research institutions. New arrangements for collaboration with the private sector must be developed. Opportunities must also be created for collaboration and synergies among all actors, especially including NGOs. The CGIAR, while functioning within the global research system, can serve, as well, as a catalyst to bring together all components in a common endeavor.

Economists tell us that we should get the prices right. I would emphasize that, equally, we must get the roles right. Toward that end, we have broadened our partnerships and deepened our collaboration with many. Our linkages with NARS, NGOs, and the private sector are strong and growing stronger day by day. We are moving ever closer to convergence of thought and action. Our strongest contribution to a global research system will, of course, be our research.


Research is the defining core of the CGIAR vision. Every contribution we make to making this world a better place to live is based on research: its relevance, its quality, its continuity, and its impact. Our vision could disintegrate into a nightmare if we do not support our research agenda fully and manage our affairs well. We cannot and *will not* substitute process for vision, unreliability for consistent support, bureaucracy for transparency, and administration for management. Coherence and cohesion shall be maintained, and enhanced.


International commitment to agricultural research remains in place. There has been a renewed interest in agriculture and rural development since the Lucerne Ministerial-Level Meeting. Many others share both our compassion and our optimism. Let us reach out to them. We have begun to do so in several ways. Our membership drive is rapidly turning the CGIAR into a fully South-North enterprise. After MTM96, sixteen of our fifty-two members will be from the South, up from zero in 1971. That characteristic must permeate every component of the CGIAR, demonstrating our sense of inclusion. The CGIAR is no longer one of the world's best-kept secrets; but that is not enough. The CGIAR must become one of the world's best-known examples of human achievement.

The past twenty-five years were a period of strenuous endeavor and also of great accomplishment. The years ahead will be no less arduous, no less significant, no less satisfying. So let us recommit ourselves to the ideals that have sustained us, and to the scientific efforts that have sustained others. In our commitment lies the seeds of hope for the disadvantaged and deprived of today and tomorrow.

Inspired by the record of the past twenty-five years and strengthened by renewal, we must face the future with hope, determination, and confidence in ourselves and our partners, however formidable the challenges of today and tomorrow might be. The magnitude of the tasks ahead seem awesome; but heights can be conquered, problems surmounted if, as a young American poet urged in another context, our spirits are ever-soaring, chasing heights swept by the winds of passion and promise, until we can one day say to those who will not dream and dare that we have:

Soared where neither lark nor eagle flew...

Done a hundred things you have not dreamed of... 



A STAPLE FOOD IN INDIA, PIGEONPEA IS THE MAJOR SOURCE OF PROTEIN FOR HUNDREDS OF MILLIONS OF VEGETARIANS. FOR CENTURIES, PIGEONPEA HAS HAD A CRUCIAL ROLE IN SUSTAINING AGRICULTURE IN RAINFED, SEMI-ARID FARMING SYSTEMS. BESIDES ITS USE AS FOOD, IT IS ALSO A MAJOR SOURCE OF FIREWOOD AND LIVESTOCK FEED. ICRISAT PLANT BREEDERS, WORKING IN COLLABORATION WITH NATIONAL SCIENTISTS, HAVE DEVELOPED A HYBRID PIGEONPEA, ICPH 8, WHICH HAS A 30 TO 40 PERCENT HIGHER YIELD THAN CONVENTIONAL VARIETIES.

International Agricultural Research and an Ever-green Revolution

M. S. Swaminathan
UNESCO Chair in Ecotechnology
Chairman, M. S. Swaminathan Research Foundation



INTRODUCTION

The birth of the CGIAR in 1971 provided both an organizational structure and a well-defined mission for international agricultural research designed for the public good. Prior to the CGIAR's founding, there were several important initiatives in international cooperation in farm research. Research networks, such as the International Wheat Rust Nursery organized by the United States Department of Agriculture, played a valuable role in promoting symbiotic partnerships in the control of important diseases. International explorations and collections of genetic resources, such as the Commonwealth Potato Collection, helped national research systems obtain donors of resistance to biotic and abiotic stresses. FAO's locust control program proved the effectiveness of organized collaboration in preventing the spread of serious pests.

While all of these initiatives were important, it was the efforts of the Ford and Rockefeller Foundations in organizing international agricultural research centers, starting with the establishment of IRRI in the Philippines in 1960, which really brought to light the power of a critical mass of mission-oriented, interdisciplinary science in solving the chronic problems of food insecurity and famine. In 1965 the two foundations converted a Rockefeller Foundation-sponsored program on the improvement of maize and wheat in Mexico into a well-organized international center—CIMMYT. Two more international centers—IITA in Nigeria and CIAT in Colombia—were also organized during the 1960s.

The history of the wheat and rice revolutions in Asia, triggered by the high-yielding varieties developed at CIMMYT and IRRI, is not well known. The factors which led to the transition of the Indian food economy from the position of “basket case” to one of “bread basket” have been chronicled in the book, *The Wheat Revolution—A Dialogue*.¹ The award of the Nobel Peace Prize to Dr. Norman E. Borlaug of CIMMYT in 1970 provided convincing evidence of the role of international agricultural research in promoting a hunger-free world.

THE BIRTH AND GROWTH OF THE CGIAR

Warren Baum has documented the history of the CGIAR in his book, *Partners Against Hunger: The Consultative Group on International Agricultural Research*.² He described the role of the Bellagio meetings in

articulating the vision for international agricultural research. The donors who decided to bring the CGIAR into existence in 1971 made four important decisions which led to the phenomenal success of this unique organization.

First, the CGIAR was designed as a non-bureaucratic, flexible organization with no written constitution, but with members coming together with a shared concern for the problems of hunger and poverty, and a shared commitment to provide sustained financial support to international agricultural research centers established with a clear vision and mission.

Second, the founders of the system decided to build on the model of the Ford and Rockefeller Foundations of institutional structure and to ensure the autonomy of centers under boards of trustees. Linking autonomy and accountability at the institute level provided an enabling environment for creative and socially relevant research.

Third, the support structures designed to ensure adequate financial support and policy and technical oversight helped to accelerate rather than hinder progress. The formation of a Technical Advisory Committee, and the location of the CGIAR Secretariat in the World Bank and the TAC Secretariat in FAO, the formation of a core cosponsor group (initially consisting of FAO, UNDP, and the World Bank, and now including UNEP), and the organization of an annual International Centers Week to monitor progress and to effect midcourse corrections were all acts of foresight and vision.

Finally and most importantly, it was agreed that support for the centers should not be at the expense of support to national agricultural research systems, since it was realized even then that the stronger the NARS, the greater its capacity to benefit from the work of the centers. It was also decided that the centers should, as a rule, be located in developing countries, unless there were special reasons or advantages to locating them in industrial countries, as was the case with IFPRI, IPGRI, and ISNAR.

I have watched with admiration the CGIAR system develop during the last twenty-five years. Prior to the establishment of the CGIAR, Indian agricultural scientists had extremely beneficial collaboration with IRRI and CIMMYT, a partnership whose fruits led to the coining of the term “green revolution” in 1968 by Dr. William Gaud of the United States Department of Agriculture. In 1971, I was invited to serve as Vice Chair of the first

TAC, when Sir John Crawford was Chair. In 1975, I served as the Chair of the quinquennial review of IRRI, the first of its kind to be undertaken by the CGIAR. Since then I have served as Board Chair or Trustee of several centers, and also as Director General of IRRI. Therefore, the balance sheet I shall attempt here is based on a fairly close interaction with the system at different levels during the past twenty-five years.

THE CGIAR: A TWENTY-FIVE-YEAR BALANCE SHEET

Beneficial Impact on Food and Livelihood Security

The significant contributions the CGIAR has been able to make to strengthening global and national food security systems and to improving the livelihood security of farm families with smallholdings and those living in arid and semi-arid environments can be grouped into seven broad categories. The findings I have chosen are illustrative and not exhaustive.

New Ideas and Concepts

The plant type concept developed and promoted in wheat and rice, to enable the plant to respond to good water and soil fertility management, had a far-reaching impact on the productivity and production of these two major staples in developing countries. High-yielding varieties of these and other crops have helped to promote a climate of confidence in the human capacity to build a sustainable global food security system.

Another major concept first developed for wheat, and later adopted for several other crops, was the value of “shuttle breeding” for incorporating the character of photo-insensitivity in crop varieties. Growing different hybrid generations under diverse environments for the purposes of selection has proven to be an effective method of developing varieties with broad adaptation.

Similarly, several other findings in land, water, and pest management, and the analysis of constraints and consequences in relation to new technologies and policy research, have had great influence on contemporary agricultural research methodologies and strategies. It is also important to recognize that the research done in the mandate crops of the centers has had a ripple effect on other crops and farming systems. This helped to

impart a higher degree of scientific excellence and relevance in the work of many NARS in both developing and industrial countries.

Interdisciplinary Research

CGIAR institutions have demonstrated clearly the value of multidisciplinary, mission-oriented research in both finding solutions to complex field problems and in accelerating the pace of progress in reaching the desired goal. Most centers were able to make a significant impact on science and society within a few years after their establishment only because of their ability to mobilize interdisciplinary science and inter-institutional collaboration to study and solve problems on a system basis. This approach of harnessing science for solving a problem rather than for worshipping a discipline has had far-reaching influence on the research strategies of NARS.

Social Science and Policy Research

The work of the centers, and particularly of IFPRI and ISNAR, has shown the vital role of the integration of social, biological, and physical sciences in moving agriculture forward. The human dimensions of the problem, including the very important component of gender equality, often tended to get ignored under a “technological quick-fix” mind-set. Fortunately, centers have tried to integrate social science research with mainstream technological activity, so that the packages of services and public policies, needed for providing the substrate conditions under which new technologies can strike roots and help to achieve the desired impact, also receive concurrent attention. Quite often, production programs initiated without attending to the preconditions essential for success, such as rural communication and energy supply, land leveling and consolidation, water harvesting and management, input and output pricing, marketing, and land ownership and tenurial relationships, come to grief.

Networking

The work of several centers has demonstrated that, irrespective of the individual strengths of NARS, the collective strength of NARS and their partner centers can be considerable. It is this collective strength, whether it be in the case of new material, or management practices, or public policy formulation, which has helped to rapidly spread the benefits of new

technologies. The networks of the centers have by and large been very successful, since all partners see benefits for themselves. Above all, such networks, which often involve traveling workshops, have helped to foster a spirit of cooperation and personal rapport among scientists working on a crop or a common problem, irrespective of political frontiers.

Capacity Building and Organization and Management of Research for the Public Good

The work of the centers has demonstrated that, without an adequate research and training backup, the success of large agricultural development projects will be short lived. As mentioned earlier, the stronger the NARS, the greater is the benefit it derives from the centers. This realization, in turn, has stimulated governments of developing countries to accord greater social prestige to agricultural scientists and to provide enhanced financial support to national agricultural research, education, and extension programs. ISNAR, in particular, has been playing an effective role in strengthening the management of NARS. Training has always received high priority in the work of the centers, and today CGIAR alumni constitute a dominant force in shaping the global agricultural destiny.

With the integration of environmental sustainability considerations in the research agenda, it has become obvious that location-specific and participatory research with farming families is vital for achieving sustainable advances in the productivity and profitability of major farming systems. Hence, the CGIAR's role in strengthening NARS, either directly or indirectly, can be regarded as one of its most enduring contributions.

Fostering Coalitions of the Concerned

The CGIAR has been instrumental in bringing about several valuable coalitions for organizing research for the public good. Notable among them are the alliances between advanced laboratories working on frontier science both in industrial and developing countries and centers, on the one hand, and the specialized agencies of the United Nations and centers, on the other. The collaboration between IRRI and the Rockefeller Foundation in organizing the Rice Biotechnology Network is a good example of the value of the involvement of advanced scientific institutions in solving chronic food problems. The CGIAR-FAO partnership, in dealing with the complex issues of equity in sharing the benefits of genetic conservation,

evaluation, and utilization, illustrates how centers can contribute to the implementation of the decisions made at inter-governmental forums.

Filling the Gaps and Reordering Priorities

Finally, the process of continuous self-evaluation, adopted by the CGIAR system from its very inception, has helped to fill major gaps in ongoing research efforts at the global and national level. For example, the very first institute established after the founding of the CGIAR was ICRISAT, to serve the needs of semi-arid, rainfed areas characterized by agricultural instability and poverty. ICRISAT came into existence within nine months of the establishment of the CGIAR. ICRISAT, together with ICARDA, established a few years later, addressed the research challenges of ecologically and economically handicapped farm families.

The inclusion of IIMI, ICRAF, and ICLARM into the CGIAR system, and the establishment of CIFOR, have helped centers to introduce a farming systems and agroecological perspective in agricultural research. These steps have, in turn, stimulated the adoption of a farming systems approach in the research strategies and organizational structures of NARS. Without such an approach, the two major threats to sustainable food security, namely degradation of the natural resource base and growing rural poverty and unemployment, cannot be addressed.

While the above are just a few examples of some significant beneficial transitions in agricultural research and development brought about by the CGIAR during the last twenty-five years, there have also been some major concerns worthy of mention.

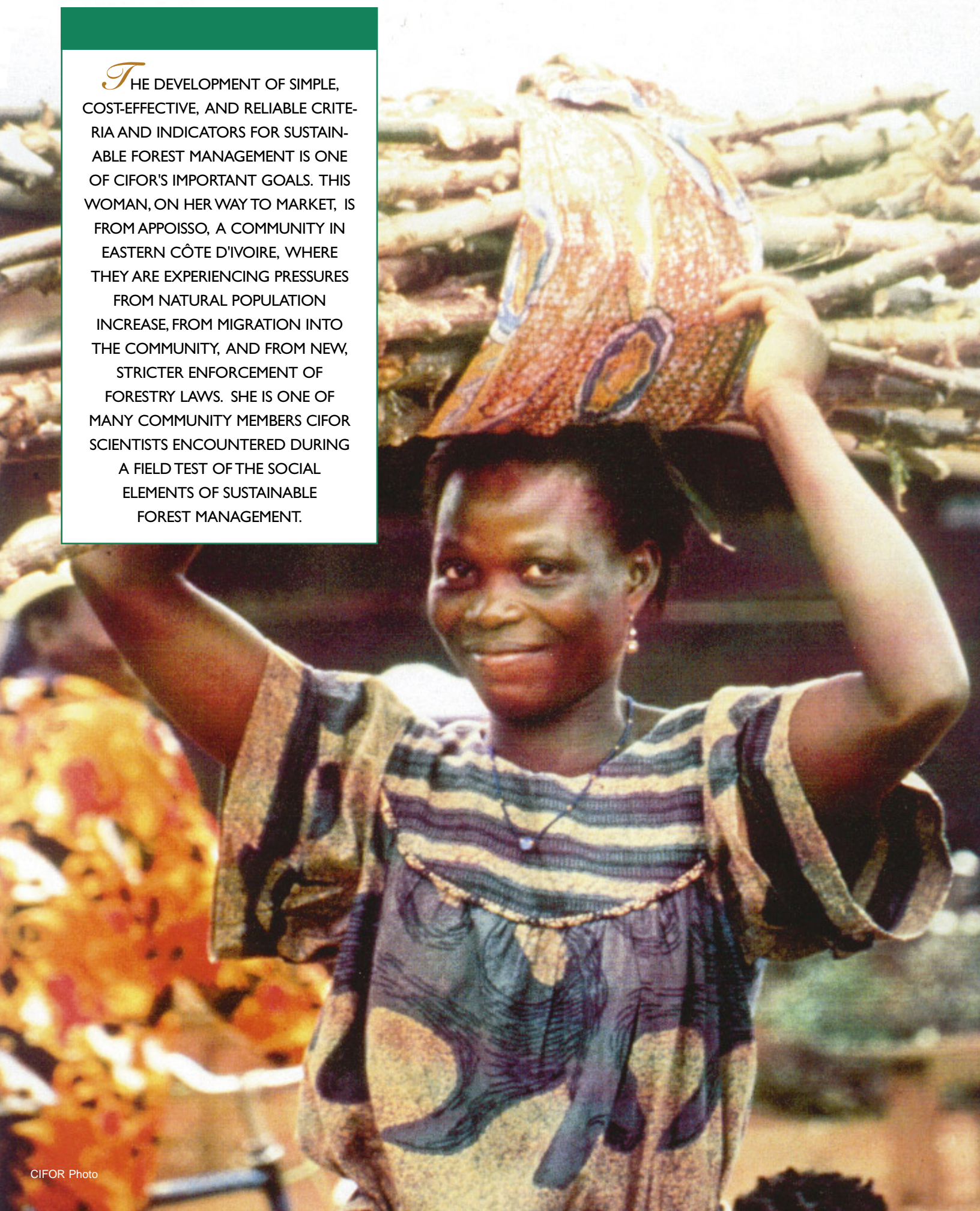
Concerns

The major concerns expressed by several developing countries and by non-governmental organizations with reference to the research strategies and contributions of the CGIAR fall under seven major categories. I would like to refer to them briefly.

Ecology

Much has been written about the dangers of genetic homogeneity, excessive use of mineral fertilizers and chemical pesticides, and the prob-

*T*HE DEVELOPMENT OF SIMPLE, COST-EFFECTIVE, AND RELIABLE CRITERIA AND INDICATORS FOR SUSTAINABLE FOREST MANAGEMENT IS ONE OF CIFOR'S IMPORTANT GOALS. THIS WOMAN, ON HER WAY TO MARKET, IS FROM APOISSO, A COMMUNITY IN EASTERN CÔTE D'IVOIRE, WHERE THEY ARE EXPERIENCING PRESSURES FROM NATURAL POPULATION INCREASE, FROM MIGRATION INTO THE COMMUNITY, AND FROM NEW, STRICTER ENFORCEMENT OF FORESTRY LAWS. SHE IS ONE OF MANY COMMUNITY MEMBERS CIFOR SCIENTISTS ENCOUNTERED DURING A FIELD TEST OF THE SOCIAL ELEMENTS OF SUSTAINABLE FOREST MANAGEMENT.



lems of soil degradation and groundwater pollution associated with high-yield technologies. Several of these concerns are genuine, and, in later years, centers have developed and actively promoted techniques such as integrated pest management and integrated soil health care. The largest global *ex situ* collection of crop genetic resources, which is also value-added in terms of information, is also a contribution of the CGIAR. This is a contribution of inestimable value to safeguarding the future of global food security.

Equity

The green revolution technologies have been described by some as having built-in seeds of social discrimination leading to the rich getting richer and the poor getting poorer. Since inputs are needed for output, those who have no access to credit or water or other production inputs will not be able to take advantage of new technologies. It is now widely realized that the solution to this problem does not fall in the realm of science, but in resource-poor, farmer-oriented public policies. Countries which have not promoted active agrarian reform leading to the poor having access to production assets like land, water, credit, new skills, and markets will certainly deny the resource-poor farming families the technological opportunity to enhance productivity and, thereby, household income.

The gender insensitivity of the CGIAR's research agenda during the 1970s has been a subject of criticism. This situation changed dramatically with IRRI's initiative in 1983 to promote organized research related to women in rice farming systems.

Economics

Farmers make decisions both on the choice of technologies and on investment in inputs based on the cost-risk-return structure of a particular farm enterprise. Where investment is high, the risk is also high, particularly in regions prone to floods, drought, and cyclonic storms. The resource-poor farmer chooses risk-minimizing technologies, while those with resources prefer profit-maximizing technologies. Scientists face the challenge of achieving reduction in the cost of production without lowering yield, while public policymakers should introduce the necessary credit, marketing, and insurance policies which can enable all farmers, irrespective of their innate input-mobilizing and risk-taking capacity, to derive benefit from technological progress. At the same time, centers can help to enhance farm income and employment

by adding to their research agenda the triple goals of environmentally sustainable yield intensification, market-driven farming systems diversification, and value addition to every part of the biomass. There is currently a mismatch between production and postharvest technologies in the research priorities of both centers and NARS. Unless the mismatch is ended, neither producers nor consumers will benefit fully from higher yields.

Energy

The birth of the CGIAR coincided with an era of escalating fossil fuel energy prices. Several articles entitled “The Death of the Green Revolution” appeared in the media during 1972 to 1975. Farmers, however, proceeded vigorously with the adoption of new technologies, with the result that the pace of agricultural progress was not only not inhibited, but was accelerated. For example, India’s wheat production, which was about 20 million metric tons at the time the price of petroleum products went up in the early 1970s, has now reached a level of 65 million tons.

The increase in the cost of inputs derived from fossil fuel-based feedstocks stimulated centers and NARS to intensify research on energy use efficiency [I am using the term energy in a generic sense, including fertilizers and pesticides], and on substituting renewable and farm-grown biological energy sources for petroleum-based inputs.

Ethics

In an address to the FAO General Assembly in 1983, delivered in my capacity as Independent Chairman of the FAO Council, I urged that: “We should avoid eternally living rich and talking poor.” This principle applies equally to the CGIAR. There is a genuine feeling among NGOs that the CGIAR has not been aggressive enough to prove its “pro-poor” mandate at the field level. There is also the feeling that gender and social equity have not been high on the agenda of many centers, since their concern has been more on commodity production than on the equitable distribution of economic benefits.

Regional Imbalances

In the coming millennium, the food security challenge is more likely to be national and regional, and less global. It is in this context that there

is concern about the situation in Africa, where many countries have not managed to improve their food situation, in spite of the work of the centers. It is becoming clear that such a situation can be altered only through more location- and culture-specific technologies and public policies.

Unevenness in the Control of Policymaking Bodies


A growing concern relates to the uneven distribution of key positions like TAC and Board Chairs, Directors General, and senior staff, with an unduly large proportion going to industrial countries. This has resulted in the demand for the UN principle of “one country-one vote” in the governance structures of the CGIAR.

MALTHUS AND THE CGIAR


In 1798, when Thomas Malthus warned about impending famines due to an adverse balance between population and food supply, the global population was about 920 million. This is the population of India today. More than 86 million people are likely to be added to the world’s population every year, taking the global population to nearly 8 billion by the year 2020.³ Nearly 50 percent of them will be living in urban areas, with a higher consumption capacity and more diversified food habits. IFPRI’s 2020 Vision for Food, Agriculture, and the Environment indicates that the challenge of feeding 8 billion people can be met, provided investment in agricultural research for the public good is enhanced, and provided research is supported by appropriate public policies and programs in the area of training, techno-infrastructure, and trade.

The steps taken during the last three years to “re-engineer” the CGIAR, both to maximize its impact and effectively address the concerns I have listed, indicate that the CGIAR will continue to be the flagship of the “Science for Sustainable Food Security Movement.” The major aim of the re-engineered CGIAR should be to promote an “ever-green revolution” based on a pro-nature, pro-poor, pro-woman, and pro-employment orientation to technology development and dissemination.

The CGIAR has been a major factor in keeping the Malthusian specter of food scarcity at bay during the past twenty-five years. With the continued commitment of donor nations to supporting international agricultural research designed for the public good, and with enhanced alloca-

tions for national agricultural research and extension systems by developing countries, the long-cherished goal of a hunger-free world need not remain a dream. According to experts like Lester Brown,⁴ 1996 may mark the beginning of an era of dwindling grain stocks and escalating food-grain prices. There is, thus, no time to relax, and “we have to run twice as fast to stay where we are.” The CGIAR’s mission and programs remain not only as relevant today as they were twenty-five years ago, but are even more urgent and significant under the prevailing conditions of gross economic and gender inequity, where “orphans will remain orphans” in terms of scientific priorities unless conscious efforts are made to orient science for the public good. 

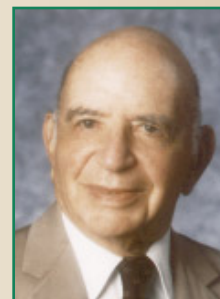
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- ¹ Swaminathan, M. S. (ed.). 1993. *The Wheat Revolution—A Dialogue*. MacMillan India Ltd., p. 164.
 - ² Baum, Warren C. 1986. *Partners Against Hunger: The Consultative Group on International Agricultural Research*. The World Bank, Washington, DC, p. 337.
 - ³ *The State of World Population*. 1996. United Nations Population Fund.
 - ⁴ Lester Brown and Hal Kane. 1994. *Full House: Reassessing the Earth’s Population Carrying Capacity*. New York: W. W. Norton and Company, p. 261.



*D*ANIEL MARCHENA, PRESIDENT OF THE EL CHAUPÍ ASSOCIATION OF AGRICULTURAL PRODUCERS NEAR VILCABAMBA IN ECUADOR'S LOJA PROVINCE. ONE OF THE ASSOCIATION'S MAIN ACTIVITIES IS THE PRODUCTION OF HIGH-QUALITY SEED OF IMPROVED COMMON BEAN VARIETIES. IN ESTABLISHING THIS SMALL-SCALE ENTERPRISE, THE ASSOCIATION RECEIVED TECHNICAL SUPPORT FROM THE CIAT-SPONSORED REGIONAL BEAN PROJECT FOR THE ANDEAN ZONE (PROFRIZA), FUNDED BY SDC. THE SUPPORT WAS CHANNELLED THROUGH ECUADOR'S NATIONAL INSTITUTE OF AGRICULTURAL RESEARCH (INIAP).

Recollections of the Early Years

Richard H. Demuth
CGIAR Chairman 1971-1974



What a pleasure it is to be asked to share recollections of the start and early years of the CGIAR, which I served as the first (designated) Chairman and which is now celebrating its twenty-fifth birthday. The current participants in what has become the world's principal sponsor and coordinator of international agricultural research will doubtless find it difficult to appreciate the excitement and trepidation with which my colleagues and I awaited the initial meeting of the CGIAR two and a half decades ago. We had no mandate to guide us and no precedents to rely on for organizing and operating what, at the time, was a unique gathering of diverse and powerful members. Although we were then dealing with only four existing centers, with annual financial requirements of around \$10 million, we faced a number of difficult issues the solutions to which were far from clear. Yet, despite our fears and uncertainties, the start made by the Group at that first meeting laid solid foundations for the remarkable entity we know today.

In thinking back to those early years, the first thing that comes to mind is the outstanding character of the personae involved: George Harrar, Dave Bell, Frosty Hill, Sterling Wortman, Ralph Cummings, and Lowell Hardin, among others, from the Ford and Rockefeller Foundations, the originators of the wonderful center concept; Norman Borlaug, Bob Chandler, and many other outstanding scientists, who proved that the center concept worked; John Hannah from USAID and Bill Mathiessen from the UK ODA, who provided critical financing; the late, beloved Jim Evans, Director of the World Bank's Agriculture Department, and Mike Lejeune, of the Bank staff and the CGIAR's first Executive Secretary; Myer Cohen and Bill Mashler from UNDP and Peter Oram from FAO, the Bank's fellow cosponsors; and always Sir John Crawford, Chair of TAC, who provided constant and stalwart support.

The second thing that comes to mind is the remarkable cooperative spirit that permeated the several meetings of the CGIAR which I was privileged to chair. Members *wanted* the Group to succeed and joined together to find innovative solutions to problems which might otherwise have caused divisive debate. They did this with an extraordinary informality that permeated all of our meetings. I can recall no other official grouping in which the participants were so united to achieve a common goal.

We did have a number of difficult problems. One was, of course, representation of the developing countries. Another was whether to establish

a central fund to finance the Group's sponsored research or to function through voluntary coordination by participating donors. A third which I recall was how to deal with the political sensitivities raised by a request for support from a vegetable research center located in Taiwan. And there were procedures to establish for reviewing the budgets of the system's centers, while still maintaining the necessary independence and authority of their boards of trustees for analyzing proposals for new programs, and for meshing the deliberations of TAC and of the CGIAR. All of these issues, however, were resolved harmoniously.

The Group had a number of substantive achievements, too, during those early days. I remember with particular satisfaction the decisions to accept CIP into the system and to establish as new entities ICRISAT, ILRAD—now ILRI, and IBPGR—now IPGRI. Their many accomplishments to date have contributed much to the CGIAR's success.

A final word on a more personal note. In 1973, when I turned over the chairmanship to the highly competent hands of my successor, Warren Baum, I knew I had just completed the most rewarding assignment of what had been an altogether fascinating twenty-seven-year career at the World Bank. The CGIAR has more than fulfilled the hopes which I and my colleagues in the Bank, UNDP, and FAO had when it started twenty-five years ago. May it continue to flourish for many years to come. 🌾

The Evolution of the CGIAR

Warren C. Baum
CGIAR Chairman 1974-1983



My introduction to the CGIAR took place at the Virginia farm of Haldore Hanson, then-Director General of CIMMYT, in October 1974, immediately before my inaugural session as Chairman of International Centers Week. I was struck by the collegiality of those present (mostly agricultural scientists) who knew each other well, from their common educational backgrounds at Cornell or Iowa State University or their association with the Rockefeller or Ford Foundations. It was the first time I felt that my graduate education at Harvard University placed me at a disadvantage! I was also struck by their down-to-earth and friendly spirit and the warmth of their welcome to someone of whom they knew nothing except that he was clearly of a different breed—a warmth that never flagged in the ensuing years.

The CGIAR was then three years old, and all of the component parts were already in place. It was off to a strong start under the capable leadership of the Group and TAC Chairs, Sir John Crawford and Ralph Cummings, both highly experienced, and with the full support of the two foundations.

In the next ten years the CGIAR went through a whole cycle of activity. By the end of 1973, three additional centers (ICRISAT, CIP, and ILRAD—now ILRI) had joined the original four. In the next three years, through 1976, four more centers were added (IBPGR—now IPGRI, WARDA, ILCA—now ILRI, and ICARDA). Some of these were already in existence; others were the fruits of studies launched at Bellagio in 1970. The total now stood at eleven, with several additional centers or programs denied admission because of their location, the character of their programs, or other considerations. The years 1977 to 1979 were officially designated as a period of consolidation, during which no new activities were adopted so that the existing centers, and their mounting financial requirements, could be absorbed. Work proceeded, however, on new proposals, and ISNAR became operational in November 1979, precisely at the end of the period of consolidation.

IFPRI, which presented several unique problems, was accepted the second time around, in 1980. This brought the number of centers to thirteen, where it was to remain for ten years. Worldwide economic difficulties beginning in 1980 had their impact on the financing of the system, introducing a period of constrained resources with serious issues of resource allocation, which continued far beyond my tenure.

The growth in the number of donors, and in the funds provided, followed a similar pattern. In 1972, the CGIAR's first full year, sixteen donors contributed \$21 million. In 1974 the number of donors stood at twenty and their contributions at \$35 million. Ten years later, at the end of the period I am discussing, there were thirty-five donors and the funds contributed were \$165 million. Funding increased in nominal terms every year, and in real terms every year but one. By any standard, the first thirteen years were ones of impressive growth, despite the slowing down and maturing of the system.

From the beginning my principal preoccupation was how this novel enterprise was to be governed. Early references to the CGIAR as a "forum," "an arrangement for consultation," or "a loose federation of centers" were disingenuous and undoubtedly aimed at placating the doubters. The term "Consultative Group" was itself something of a misnomer, since it bore little resemblance to the Bank-chaired Consultative Groups from which it drew its name. For an international activity that immediately began to function on its own, the organizational structure and procedures were extraordinarily loose and informal. Decisions had to be made without any voting system, and none was ever devised; these decisions had to be binding within an organization that had no legal identity; and funds had to be pledged and commitments honored without any method of cost-sharing, since as in the case of voting, no formula could fit so diverse a collection of international, regional, national, and private donors. Under other circumstances, these characteristics could be a recipe for failure, but for the CGIAR they have generally been sources of strength.

Decisionmaking by consensus presented a continuing challenge to one steeped in the hierarchical traditions of the World Bank. But even the largest donors seemed to enjoy the collegial and egalitarian spirit. My task was to ensure that the necessary staff work was done in advance; to lead (but not manage) the discussion in an impartial manner, allowing everyone who wished the opportunity to speak, while moving the discussion along; and then to identify and formulate a consensus that could command majority agreement or general consent, without ever defining the "majority," and implicitly recognizing on rare occasions that all donors were not created equal. Committees were established only for special purposes; the donors preferred to act as a Committee of the Whole, from which no one was excluded. I, too, felt that this was appropriate, even though it made the job more difficult.

The TAC Chair, who was always respected, played a major role in presenting issues such as consideration of new centers, research priorities, and center programs and budgets. The three cosponsors, including a World Bank representative separate from the Chair, always provided support, often behind the scenes, and a legal foundation to the whole enterprise. Goodwill, based on a common perception that an important and clearly focused objective was being effectively pursued, was the amalgam that made all this possible.

Fundraising, a particular responsibility of the Chairman, was one to which I did not look forward. But as the international character of the CGIAR became increasingly apparent, I found that I, often accompanied by the TAC Chair or one or more Center Directors, took pride in recounting its success story, usually to a receptive audience. I believe that many donors contributed more generously than they would have under a quota system. The public process of voluntary pledging exercised some moral suasion. USAID held steadfast throughout these years at the 25 percent share that John Hannah had promised in Bellagio, and this combined with the World Bank's 10 percent, later raised to 15 percent, provided a financial anchor. Even during the period of financial stringency, the CGIAR fared well compared with other aid activities.

Frosty Hill and George Harrar had established IRRI and CIMMYT as models of "international centers of excellence," with an independent staff of internationally recruited scientists reporting to an autonomous and international board of trustees. Donors all agreed that the independence and autonomy of the centers were to be prized and preserved. But autonomy had to be reconciled with accountability. The foundations had once provided this stewardship, but now accountability became a major preoccupation. The ever-growing number of donors had to be satisfied, to satisfy their parliaments, that their contributions were being used wisely and productively. Over time a comprehensive system of reviews was introduced, including: annual program and budget reviews of each center; quinquennial program reviews of each center, starting appropriately with IRRI and then CIMMYT; periodic management reviews of each center; five-year reviews of the CGIAR system itself; "stripe" reviews of across-the-board issues; and several studies of the development "impact" of the collective work of the centers. The list seems formidable, and Center Directors and Board Chairs may have found it so, but it met the needs of the donors.

What were my regrets? That, despite the growing number of developing country donor members, we were not able to increase sufficiently the participation of the South at group meetings, representation through the UN regions not having proved successful. That we were not able to bring the practice of donor-financed “special projects” under better control. I thought that our efforts at annual aid allocation through program and budget reviews left something to be desired, but then I have never met a program and budget review system that I liked. While we were certainly aware of environmental concerns, it was not to the extent that is prevalent today.

What did I enjoy most about my CGIAR experience? Many things come to mind, but particularly: enabling the CGIAR to win the King Baudouin Prize; receiving the beneficent title of “Chairman Emeritus” on retiring; having the opportunity, thanks to a World Bank sabbatical, to write *Partners Against Hunger*; with a fellowship from the Rockefeller Foundation to work as a “resident scholar” at Bellagio; and a handwritten note from the ailing Frosty Hill enthusiastically welcoming the book’s publication. But above all I valued the occasional comments of participants that CGIAR meetings were the international gatherings that they liked most (sometimes the only one!) since they gave me some assurance that the collegial spirit had not been lost during the decade in which the CGIAR came of age.

Others are better equipped than I to talk about the future, but the broad outlines seem clear. The experts inform us that food production will have to double by the year 2025 to keep pace with the inexorable growth of population. Most of this increase will have to come from existing land. Research must play a vital part in making possible the necessary increases in productivity. The CGIAR, now renewed and revitalized thanks to the efforts of its present Chairman, remains strategically placed to play a central role. 🌾



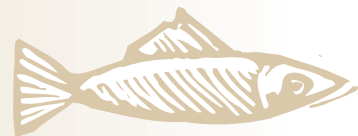
FROM “HUNTING” TO FARMING FISH

Within fifteen years, fish farming and sea ranching could provide nearly 40 percent of all fish for the human diet and more than half of the value of the global fish catch. Fish is the fifth most important agricultural commodity and accounts for 7.5 percent of total world food production. More than one billion people in developing countries depend on fish as their primary source of animal protein.

Global fish catches increased five-fold between 1950 and 1989 to some 100 millions tons, but overall production has stagnated since then as fishers have exhausted new sources of supply. Nine of the world's seventeen major fishing areas are in serious decline, with four depleted commercially. The main reason is too much fishing.

Between aquaculture and captive fisheries there is a great range of technologies whose possibilities have barely been tapped. These include: sea ranching; the capture and resettlement of fish larvae; and marine feed-lotting. A number of examples demonstrate the opportunities possible in cultured fish, including: breeding improved tilapia fish; cultivating giant clams; and seeding sea scallops spat into the natural environment.

ICLARM believes that one of the best ways to expand aquaculture in the developing world is to integrate fish farms with land-based agriculture, improving both in a process called Integrated Resource Management. IRM brings farmers and scientists together to transform existing small-scale farms into integrated agriculture-aquaculture systems. IRM seeks to develop systems for “new entrants” into aquaculture among the poorer groups of farmers in less favorable environments, and to rehabilitate water sources and increase incomes and food security of small farmers.



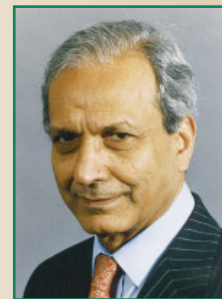
Excerpted from CGIAR Press Release May 14, 1995

*I*ITA SCIENTISTS HAVE OVERCOME A MAJOR THREAT TO PLANTAIN CULTIVATION BY DEVELOPING NEW VARIETIES FROM A CROSS BETWEEN PLANTAIN AND A WILD BANANA. THESE ARE RESISTANT TO THE DEVASTATING BLACK SIGATOKA LEAF SPOT DISEASE WHICH REDUCES BUNCH YIELDS BY 30 TO 50 PERCENT. AFTER A PERIOD OF WIDESPREAD AND SUCCESSFUL EVALUATION AT TESTING SITES IN MAJOR PLANTAIN AND BANANA GROWING REGIONS, EXTENSIVE DISTRIBUTION OF THE NEW VARIETIES TO FARMERS WILL TAKE PLACE IN THREE TARGET COUNTRIES—GHANA, NIGERIA, AND UGANDA—DURING 1997 TO 1998.



Appreciating a Successful Development Initiative

*S. Shahid Husain
CGIAR Chairman 1984-1987*



The Consultative Group on International Agricultural Research is perhaps the most successful development initiative of the last fifty years. It has brought together scientists, research centers, foundations, international organizations, and governments in developed and developing countries to increase food production in developing countries. The results are beyond the expectations of its founders. The international research centers have made an invaluable contribution to the impressive increase in food production and rural employment in developing countries, particularly in Asia. They have helped to prevent mass hunger, considered inevitable as recently as in the early 1970s.

The work of researchers is never done. So is it with the CGIAR and the centers supported by it. Population continues to grow rapidly in developing countries. The strain on natural resources is heavy. Progress on African agriculture and arid and semi-arid lands is inadequate. Above all, our physical capacity to produce is increasing faster than our social and organizational capacity to manage, and deal with the consequences of, physical change. The risk to developing countries is that the current fatigue with international development efforts may weaken the capacity of the invaluable system that has developed during the last twenty-five years. A coordinated effort is needed to maintain the CGIAR's strategic focus on food while incorporating in its work the crucial issue of the environment. We must, at all cost, resist the temptation for proliferation.

I have worked on development issues for nearly forty years. Nowhere else have I seen the skills and dedication that the scientists of the CGIAR system have brought to bear on their endeavor. My four years as Chairman of the CGIAR were the most stimulating and rewarding years of my working life. I admire the strategic vision of Robert McNamara and Sir John Crawford in sponsoring the establishment of the CGIAR and supporting its work. As one from a developing country, I am deeply grateful to them and to the many others who have contributed to our system. 🌾

A Look Back, A Look Ahead

W. David Hopper
CGIAR Chairman 1987-1990



When CGIAR Chairman Ismail Serageldin asked me to prepare a few brief remarks for this twenty-fifth anniversary occasion, I found myself with two temptations: to reminisce about the past—something former Chairmen love to do—or talk about my vision of the future as “guidance” to the present Chairman. With a strong exertion of self-will I have resisted either temptation and have done both.

While we now celebrate the twenty-fifth anniversary of the CGIAR, it is an anniversary in the formal sense only. In fact, the CGIAR had its beginnings almost four decades ago by one count, or over fifty-three years ago by another. CIAT, CIMMYT, and CIP emerged in the 1960s as new incarnations of old Rockefeller Foundation programs, whose origins can be traced to 1943. These institutes, in their new guise, reflected a 1957 joint enterprise between the Rockefeller and Ford Foundations to jump-start global food production. The formal institutional structure began with the first of the Ford and Rockefeller joint ventures: IRRI. It was designed in 1958 and opened in 1962. By the mid-1960s the joint venture had been followed with three additional institutes: CIMMYT; CIAT, from older Rockefeller Foundation initiatives; and IITA, a new venture in tropical Africa. By the late 1960s the research findings and newly released varieties from these four institutions, supported by appropriate governmental policies, had launched a transformation in food agriculture from traditional agrarian to modern, science-based, intensive crop production in South and Southeast Asia and in parts of Latin America.

The influence and promise of the joint venture, coupled with a still disquieting longer-term outlook for world food, led the foundations to seek a wider inclusion of donor participation. With the added sponsorship of UNDP, the World Bank, and FAO, the leaders of the major donor agencies met in 1969 at the Rockefeller Foundation’s Bellagio Conference Center to review the global prospects for agricultural development in the tropics. By mid-1971 the CGIAR was launched at the World Bank under the sponsorship of UNDP, FAO, the World Bank, and an initial group of just over twenty donors.

The new CGIAR was a lusty infant. The friendly takeover by the CGIAR of the joint venture institutes gave it a spectacularly successful worldwide research establishment—an establishment that grew quickly under the new management.

It is fair to ask what this close to fifty years of history has brought to those who built the substructures and now support the CGIAR.

In my view the most important accomplishment of the second half of this century was the work of joint venture and CGIAR scientists in raising the yield potential of the world's major cereals in the tropics to the levels of those attained during the first half of the century by agricultural scientists working in the temperate regions—levels that were double or quadruple traditional tropical yields. Innovative farmers did the rest. They were backed by the enlightened help of imaginative governments with the necessary institutional and infrastructural support for their innovation.

Farmer, private sector, and government willingness to grasp and subdue the risks of change together assured the daily bread and bowl of rice for a world population that has almost trebled in the last fifty years. Not a small accomplishment! And one that can be attested to by hundreds of millions of people who have never heard of the CGIAR.

This is the past. My real concerns in this note are the next fifty years. Global population will double, food demand will more than double as people shift their consumption patterns to higher-value foods that concentrate and convert large quantities of carbohydrate into protein, or claim acreage from cereals for vegetables, fruits, and other, more exotic, food products. Is there a role for a CGIAR system in this environment?

I think some of the founders of the CGIAR would argue that there is not. A rapid doubling of the “pile of rice” was the founding focus of the earlier joint venture and the CGIAR system. It was a focus that stressed the short- and intermediate-term; the meeting of the food needs of poor people within a ten- to fifteen-year horizon. And while it was a focus that today draws the occasional outburst of ire from those who see the single-minded pursuit of enhanced yield as a threat to the sustainability of the natural environment that is cultured for food production, the CGIAR has already moved a considerable distance beyond this early purpose with the inclusion of “factor” or “input” or “system” centers among the “crop” or “production” or “output” centers. But this concern aside (for that is how the founders would probably view it), what, now, is needed for the CGIAR scientists to justify their continued claim as the frontierspeople of tropical agriculture?

To me the overwhelming answer is not Asia, or Latin America; it is Africa, and especially Sub-Saharan Africa. This gigantic landmass is the only region in the world where food production per capita is falling. Here our science has been found wanting. Except for some limited agroecological areas with favorable soils and rainfall, we do not have the technology to back the innovative farmer. In addition, too often even in these limited areas, a lack of infrastructure, available factors of production (including credit), and vibrant product markets militate against any cultivator incentive to risk resources on a proffered new technology.

The CGIAR magic has yet to prove itself in Africa. Providing that proof must and should be the major focus for the Group in the early decades of the next century.

The Sub-Saharan problem is fraught with issues of neglected rural development. For many African intellectuals there is a dismaying sense that their countries have come to the table of international assistance “too late” to benefit from the largess that was lavished on Asian agricultural and concomitant rural development. Tight aid budgets from the industrial nations predispose these observers of Africa’s food outlook to argue that there must be an emphasis on agricultural development that is based on low inputs to crop production and low inputs to the infrastructures needed to promote rural development.


The present Director General of FAO, however, articulates arguments to this outlook that many of us who participated in or witnessed the Asian agricultural transformation would support. I recall a comment Dr. Jacques Diouf made two years ago on the occasion of the launching of the FAO *Special Programme for Food Security in Low Income Food Deficit Countries*: “We have tried the low input approach for several decades and it has brought us only a 2 percent decline in food output per person. That approach must be reversed. In the immediate-term we must focus on the areas of high production potential for which we have proven technologies. We must assure the farmers of these areas the full array of inputs and policies that will support their adoption of a modern, science-based system of intensive crop and livestock production. And, for the longer-term, we must develop the technologies that will bring a true transformation of agriculture to the whole of the African continent and to the other world nations that are food deficit because of lagging or backward agricultural and rural economies.”

The *Special Programme* has already revealed many nuances of the constraints to the agricultural advance in food deficit African and Asian nations. For these nations, most of which are part of Sub-Saharan Africa, the help of the CGIAR frontiersmen is an imperative need. Indeed, it is a need that reaffirms the founders' single purpose focus.

While the immediate threat of hunger is most acute in Africa, in the longer-term of a fifty-year perspective the ability of global agriculture to meet the tripling of world food demand (due to a doubled population and a continued rise in the economic prosperity of the world's peoples) must tax and shape the superb instrument of world food research that the CGIAR has become. The complex of sunlight-plant-water-nutrient-soil relations that are the foundation of agricultural science remains still a relative mystery. The recent CIMMYT-ORSTOM work on asexually propagated maize is a demonstration of the continued power of traditional plant breeding techniques underpinned now with the sophisticated knowledge of modern genetics and biotechnology. This combination of the traditional arts of agricultural science and the new horizons of biology, chemistry, and plant and soil sciences holds the high promise of establishing the firm scientific underpinnings that, over the next decades, will transform global food production science and technology. On this transformation rests the next "green revolution."

In truth, we have barely begun to unlock the deep scientific secrets of food agriculture. We still cannot deliberately manipulate the most basic chemical processes of the plant: photosynthesis and carbon fixation. A doubling of photosynthetic efficiency in cereals, bringing it closer to the efficiencies attained by sugarcane, would hold the potential to more than double yields of usable carbohydrate. Greater understanding and, eventually, manipulative control of the plant's "dark" reactions after photosynthesis could open many new paths for enhancing food production. For example, moving carbohydrate fixation from C_3 to C_4 pathways in our most common cereals would likely increase water use efficiency and provide greater drought protection. Genetically engineering the quality and composition of the protein-fat-carbohydrate components in the grain sink would open many opportunities for custom designing grains to match consumer needs. But all of these opportunities are dependent on cracking the codes of how the plant handles its most fundamental processes: the capture and conversion of daylight (the mechanism of its capture is well known) to the basic foodstuffs of humankind.

I realize that in selecting the fundamentals of photosynthesis and carbohydrate fixation I am neglecting adequate reference to pests and pathogens, to ruminants (of vital concern to both Sub-Saharan Africa and Latin America) or other ungulates, to forestry and agroforestry, to aquaculture, and even to sustainable agricultural methods and practices—all matters of interest and importance; all matters that are among the vigorous research agenda of today's CGIAR; and all matters that will be critical in the decades ahead. But for this neglect I can only plead that, except for fisheries, the deep substructure of all that we call "agriculture" rests on this complex interaction of nucleotides, photobiology, chemical reactions, and physical designs. Understanding, unlocking, and eventually manipulating this extraordinarily complicated set of processes will be the central jewel in the crown of that "Queen of the Sciences": agriculture.

The CGIAR at twenty-five years of age is the successful culmination of a chain of events begun five decades ago. It has brought food abundance to millions by transforming traditional agriculture in most of the world's tropical regions; indeed, all the farming areas of the globe, except for parts of Sub-Saharan Africa, have benefited from this transformation. The immediate task at hand is to determine the most effective means of modernizing the traditional agrarian food production systems of these neglected areas of Africa. However, the longer-term goal of CGIAR scientists must be to unlock the many secrets of the sunlight-plant-water-nutrient-soil relations that are the fundamental blocks upon which agricultural science rests. 



HALF OF REMAINING TROPICAL FORESTS CONSIDERED AT RISK

Nearly half of the Earth's remaining two billion hectares of tropical forest could be lost to agriculture, mostly due to harmful farming practices. Much of the remaining one billion hectares of tropical forest, on land generally not suitable for agriculture, are endangered by potentially harmful logging.


The annual rate of tropical forest loss is not diminishing, despite rising global awareness, sharply increased aid for tropical forestry, and a decade of international efforts to shape coherent global strategies for saving tropical forests. Some twenty-nine hectares of tropical forest are lost every minute, or 15.4 million hectares per year.

A major threat to tropical forests comes from poor farmers, who have no other option in feeding their families than to slash and burn a patch of forest and grow food crops until the soil is exhausted after a few harvests, which then forces them to move on to a new patch of forest. Slash-and-burn agriculture results in the loss or degradation of some ten million hectares of land per year.

ICRAF, CIFOR, and national and international institutes, NGOs, and universities have joined forces in a global effort to combat unsustainable slash-and-burn practices in a CGIAR systemwide program, Alternatives to Slash-and-Burn. In the long-run the program will help to reduce global warming, conserve forest biodiversity, alleviate poverty, and increase food security by developing sustainable alternatives to slash-and-burn agriculture. The program has research projects in the tropical forest margins of Indonesia, Thailand, Cameroon, Brazil, Peru, and Mexico.



Excerpted from CGIAR Press Release August 4, 1996

A photograph of a brown cow grazing on green foliage in a rural setting. The cow is in the foreground, facing right, with its head lowered to eat. The background is filled with dense green trees and bushes. A white text box is overlaid on the right side of the image.

*S*mall-scale dairy farming near Embu, on the southern slopes of Mount Kenya. ICRAF is working to integrate *Calliandra calothyrsus* trees, which produce high-quality fresh fodder for cattle, on farms in this area.

Research results show that *Calliandra* fodder can increase both milk production and the quality of milk. It is particularly important as a substitute for dairy concentrate, which farmers cannot afford. Thus, by growing *Calliandra* trees on their farms, farmers are able to increase the production and/or profitability of their smallholder dairy operations.

Challenges, Triumphs, and Confidence for the Future

Wilfried P. Thalwitz
CGIAR Chairman 1990-1991



At the end of my tenure as CGIAR Chairman, I said in a public address—the Sir John Crawford Memorial Lecture—that I shared the sentiments of one of my predecessors, Warren Baum, who once told me: “Of all the jobs I have had, the one I enjoyed most, the one that was most rewarding, was the one of Chairman of the CGIAR.” I left the chairmanship five years ago, when the CGIAR was commemorating its twentieth anniversary. Today, as the CGIAR looks back on the challenges, triumphs, and, of course, problems of its twenty-five-year-old history, my view remains unchanged. I will always remember the chairmanship of the CGIAR as stimulating, challenging, and satisfying.

The CGIAR is both a successful support mechanism for international agricultural research and a successful exercise in creative management of the development enterprise. It is something of a cliché now to say that the CGIAR does not actually exist. Some other institutions, too, have survived for several years without a formal charter, a legal personality, a corporate structure, or an empowered CEO. What makes the CGIAR special, however, is that, despite the loose arrangements under which it functions, it has been able to synthesize a broad range of views into a commonality of purpose that consistently supports agricultural research on behalf of the world's poor. That commonality has endured through changes of research emphasis, structural alterations in the configuration of centers, financial uncertainties, and changes of Chairmen.

From the Chairman's vantage position, I noted three important strengths that contributed to the effectiveness of the CGIAR. These were:

- the commitment of members who, despite divergences of views, worked at reaching consensus on major issues, and mobilized support for the centers, despite difficulties;
- the competence and enthusiasm of scientists at CGIAR centers who carried out their work with visionary zeal; and
- the analytical apparatus of the Technical Advisory Committee, which provides the CGIAR with an underpinning of options for strategy and operations.

These strengths were particularly evident and effectively combined in several key decisions that were made during my chairmanship. One of

these decisions resulted both in a new emphasis on natural resources management and on an expansion of the CGIAR system. TAC had earlier been asked to review the desirability of drawing a number of non-CGIAR centers into the CGIAR family. TAC's review was based on the premise that the CGIAR, which was initially established to help increase the productivity of tropical agriculture, should now adopt productivity and natural resources management as twin pillars of research. Following from that premise, which the CGIAR fully endorsed during a two-year deliberative process, TAC recommended that agroforestry/forestry, banana improvement, and soil and water management should be included within the CGIAR agenda. The immediate result was that some existing centers entered the CGIAR—ICLARM (fisheries), ICRAF (agroforestry), IIMI (irrigation management), and INIBAP (bananas)—and that a new center, CIFOR was established for forestry research.


These were major changes in the CGIAR research agenda. Henceforth, all CGIAR activities, including germplasm improvement designed to increase crop productivity, would be characterized by environmental objectives; for example, breeding for pest and disease resistance to minimize the use of chemicals, as well as integrated pest management where chemicals are still indispensable. The fact that CGIAR members and scientists were equally committed to transforming a strongly productivist orientation to one which gives equal emphasis to natural resources management testified to their ability to keep abreast of, perhaps ahead of, changing needs. For the revised emphasis was not simply a matter of nomenclature, but of research methodology and funding. TAC provided the foundations for a new methodology in prescribing that CGIAR-supported research should fall into two clusters: global commodity activities, and ecoregional activities. Each of these clusters was explicitly defined and described by TAC, as follows:

- *global activities* would be focused on commodities and selected subject matter areas, such as policy, management, conservation of germplasm, and the maintenance of biodiversity; and
- *ecoregional activities* would focus on applied and strategic research on the ecological foundations of sustainable production systems, commodity improvement in collaboration with global commodity activities, and interaction with national partners.

The operational and organizational significance of the ecoregional approach would be far reaching and, I gather, is still evolving.

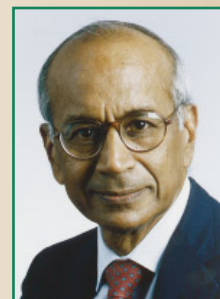
The wisdom of the “founding fathers” in creating a mechanism for independent scientific advice, and the enduring quality of that advice, were evident in these developments. TAC is the core of the CGIAR’s analytical capacity for system options. TAC’s major responsibility is to come up with options that are scientifically sound. To do this, TAC draws together the best available talent. Under the skilled and stirring leadership of TAC Chair Alex McCalla the Committee was a source of wisdom and strength. Alex McCalla himself was a star who added his own special luster.

When consensus was reached on options presented by TAC, the onus of putting new research emphasis fell on the centers, while it was up to CGIAR members to provide the necessary support. Indeed, the continuing support of the donor community became a critical issue during my chairmanship because the CGIAR system was going through a period of expansion based on scientific criteria at a time of disenchantment with ODA. In a political world that was transforming itself almost out of recognition, many major donors had their own agendas which did not embrace international agricultural research. The diplomatic task of holding donor support for the CGIAR fell on the Chairman. I enjoyed the challenge, and very much appreciated the response of donors who, after grueling discussion, maintained their commitment. An important result of the expansion exercise was that new financial systems were introduced. These involved a balance between supporting new approaches to research and ensuring full accountability. In this situation I welcomed the effort by all concerned to pull together.

Overall, I found the CGIAR vibrant and justly proud of its achievements. It has made many changes in recent years, and will face the need for more as the development equation changes. I am confident that it will continue to be as effective in the future as it has been in the past. I wish it well. 

Thoughts on the Future Focus of the CGIAR

V. Rajagopalan
CGIAR Chairman 1991-1993



It was with great trepidation that I accepted the chairmanship of the CGIAR when Wilfried Thalwitz passed on the gavel to me at the concluding session of International Centers Week 1991. My only direct contact with the CGIAR until then was through two visits to IRRI and ICRISAT as a World Bank staff member. I was, of course, familiar with its record of achievement, and with its formidable reputation.

Sitting through the closing stages of that International Centers Week, I asked myself what contribution a Chairman was expected to make toward continuing the achievements and maintaining the reputation. My reverie was disturbed by expressions of goodwill, congratulations, and introductions. I found myself being introduced to a number of Chairs of this board or that, including the TAC Chair. So many Chairs...and the CGIAR Chairman as well...it was somewhat bewildering. How did the role of the CGIAR Chairman differ from that of other Chairs? Was it purely ceremonial? To preside over meetings, read prepared speeches, and present awards? Or was it different—something more substantial?

As CGIAR Chairman, the briefings provided by the CGIAR Secretariat and discussions with TAC Chair Alex McCalla soon after I took over as Chairman gave me a good start. In my final address to the CGIAR I described McCalla as a “class act.” I realized that in the first few minutes of a visit with him in Davis (University of California), at that time his academic home. I found that his knowledge was as strong as his commitment was deep. Subsequently, with every visit to a center, I began to understand and appreciate better the mission, activities, and structure of the CGIAR and the major issues confronting the Group. I also began to see the Chairman’s role primarily as that of a catalyst, and realized that one could spend as much or as little time as one chose to in fulfilling this role.

From the visits to the centers I came away with some strong impressions. First, I was fascinated by the range of work done at the centers and by the dedication of the staff. Second, the staff were clearly concerned about the declining trend in overall funding and its impact on their work programs. Some rightly worried that the quality of science was being eroded by the uncertainty over funding. Scientists were also concerned about their career development. Third, the Center Directors were so engaged in resource mobilization efforts that their quality time for research management was getting drastically reduced. Fourth, the centers

were *not* seen by most developing countries as playing a bridging role between them and researchers in the developed countries.

However one dealt with these impressions, it was clear to me that given the collective wisdom and goodwill in the Group, certain aspects of governance, such as decision by consensus, the autonomy of the centers, and the collegial informality and nonpolitical character of the Group's deliberations, must be protected. And so, the first steps toward strengthening decisionmaking and bolstering fundraising efforts were taken at the 1993 Mid-Term Meeting in San Juan, Puerto Rico, with the setting up of an Oversight Committee and a Finance Committee from among the members of the Group.

I also felt very strongly that it was foolhardy to try to continue to support an international, multiyear, high-quality research effort on uncertain, annually pledged funds, as has been done in the past. I strongly believed that new approaches to funding were long overdue and that vigorous steps must be taken to attract trust funds from nontraditional sources and the private sector. I appealed to the donors to make multiyear commitments and exhorted the Group to establish a Trust Fund as a stabilization mechanism. My only regret has been that my term was too short to follow-up on these initiatives, but it is tempered now with my knowledge that considerable progress has been made in the last two years especially in increasing overall funding. This is a significant achievement that should be commended.


Another issue of concern to me throughout my tenure as Chairman was the weak linkage between the centers and the agricultural research systems in developing countries. I am very pleased that this issue is currently being addressed. I was distressed that the World Bank itself was not making much use of the research findings of the CGIAR centers in its agricultural pursuits. I pointed out to Bank management the need to rectify this situation and am very pleased that the new position of Director for Agricultural Research, which would provide a better link between the CGIAR and the Bank for systematic use of research findings, is now fully operational.

Essential as is the generation through research of new knowledge and technology, it is the transfer of such knowledge and technology to developing countries that would ultimately justify the existence of the CGIAR.

That this aspect needs to be constantly monitored and continuously nurtured cannot be overemphasized. It is here that the cosponsors have a special responsibility and a major role to play in enabling technology transfer through their agencies' regular activities. It will also help to deal with the concern that the CGIAR is moving away from scientific solutions and becoming more involved in technical assistance or development *per se*.

Clearly, in the years ahead, the focus of CGIAR research should be on expanding food production in low-income, food deficit countries where the majority of the world's hungry people live. Since in a number of these countries land will remain the major provider of food for increasing populations, research should help to increase the productivity of small plots and address the specific problems of poor farmers in Africa, Asia, and elsewhere. In particular, research leading to the improvement of "orphan commodities" such as cassava, coarse grains, pulses, and tropical vegetables, which are in many instances critical to the survival of poor farmers, should be specifically protected from funding cuts because they would otherwise be ignored or neglected.

The need for continuing aggressive research in all of these areas and across many disciplines by the CGIAR and national research centers is self-evident. Farmers are the first to notice when yields decline despite the ever-increasing application of inputs. They are increasingly voicing their concerns that current technologies are less and less satisfactory over time. Are current research systems sufficiently sensitive to these concerns? Today's farmer requires far more knowledge in order to make environmentally appropriate decisions and to cut costs of production. Information resources will need to substitute in the future for the all too frequent current excessive use of physical resources.

Meeting these challenges should be the future agenda of the CGIAR as it celebrates its twenty-fifth anniversary and prepares itself to continue to contribute through research to promoting sustainable agriculture for food security in developing countries. 



EARTH FACES WATER CRISIS


Some eighty countries with 40 percent of the world's population are experiencing water shortages that threaten their agriculture, industry, and health. One billion people lack access to clean drinking water in the developing world and 1.7 billion do not have adequate sanitation facilities.

Agriculture consumes 90 percent of all water utilized in developing countries. "Some 45 percent of all irrigation water does not reach the plants it is intended for, which demonstrates how extremely inefficient irrigation is under current technology and conditions," said CGIAR Chairman Ismail Serageldin. "However, that does not mean the water is totally lost. Part of it replenishes the groundwater tables and can be used again by methods such as pumping."

Effective water-saving efforts can be costly for farmers, both in the labor and capital they must invest. To facilitate these efforts, adequate technology and management practices will be needed, including: drought-tolerant crop varieties; better irrigation management practices; and better soil moisture management practices. For Africa, where poverty and rising food demand are pushing farmers increasingly into marginal lands, drought-resistant maize varieties will have to be developed as an alternative to typical dryland crops such as sorghum, millet, and cassava. New water-conserving technology and water management are now important components of CGIAR research.

Globally, the World Bank estimates that \$600 billion must be spent over the next ten years on water-related investments. Most of that total amount will be raised by the countries themselves, but \$60 billion must come from abroad for the developing world.

Excerpted from World Bank Press Release August 6, 1995



*W*ORKERS AT THE COASTAL
AQUACULTURE CENTRE (CAC) IN
THE SOLOMON ISLANDS GATHERING
JUVENILE GIANT CLAMS FOR THEIR
TRANSFER TO OCEAN NURSERIES.
GIANT CLAMS HAVE BEEN INVESTI-
GATED BY ICLARM AT THE CAC SINCE
1984, WHEN THEY WERE ON THE
VERGE OF EXTINCTION. THIS TREND
HAS BEEN SUCCESSFULLY REVERSED
THROUGH RESEARCH. NEW TECH-
NIQUES FOR GIANT CLAM CULTURE
HAVE BEEN DEVELOPED, AND
MARKETS FOR THEIR PRODUCTS
IDENTIFIED.

Future Challenges

Lucia de Vaccaro
CGIAR Technical Advisory Committee Member



The twenty-fifth anniversary of the CGIAR marks the first year following the “end of the beginning,” as Chairman Serageldin described the renewal process which he so skillfully led.

The process clearly demonstrated the urgency and magnitude of the task ahead in terms of world poverty trends, food requirements, and natural resource degradation. At the same time it provided unprecedentedly wide opportunities for discussion involving experts from a variety of backgrounds all over the world. A large body of literature was generated on a variety of scientific and operational themes. Views were expressed on the kind of research which should be done, where and how it should be carried out, and who should be the major groups of beneficiaries. Productivity increases, natural resource protection, biodiversity conservation, gender concerns, marginal *versus* high-potential lands, rural *versus* urban poor, farmer participation, institutional strengthening, and partnerships with many other types of institutions are some of the key words which capture the variety of the issues considered. In addition, by the time this Annual Report is circulated, TAC's latest recommendations on priorities and strategies for research in the CGIAR will have been published.

THE CHALLENGE FOR THE INTERNATIONAL CENTERS

Little more, it would seem, can be added at this stage to any one of these themes by an ordinary observer. Each theme in itself presents a challenge for experts. The following reflections are, therefore, concerned with a topic which, curiously, seems to have received less attention throughout the discussions, and is arguably the greatest challenge of all—namely, the task which the sixteen international centers now face of constructing the program of work which forms the CGIAR's response.

This anniversary year is particularly significant because the Medium-Term Plans covering the period 1998 to 2000 must now be written. Since the renewal process highlighted the urgency and complexity of the problems so clearly and focused the attention of a wider, more varied audience on the system, expectations are higher than ever. It is fair to add that the centers face this task at a time when many of them have had their scientific staffs reduced to a minimum, and are still dealing with the repercussions on their science programs of financial cutbacks, which the renewal process was able to alleviate, but not halt entirely.

A BALANCED RESEARCH AGENDA

To meet the challenge the centers must sift through the existing evidence and recommendations, combine them with their own very considerable experience, and craft the result into a research program which maximizes the likelihood of progress toward CGIAR goals. Deviations from the path of maximum progress are not acceptable because human misery continues and even grows. But the difficulties of achieving the optimum balances in the design and execution of the centers' work are formidable, despite their long experience in choosing criteria for decisionmaking and weighting them appropriately. So many important elements have been brought into the discussion in the renewal process that it will be a major achievement to refocus activities selectively and prevent a dilution of efforts.

Because they have occupied important places in recent discussions, two specific issues are chosen for further consideration here as examples of the complexity of the problem of balancing the research agenda. The first issue concerns the integration of research directed toward increasing productivity and protecting the environment. The second issue refers to working in partnership.

SPECIFIC CHALLENGES

The Balance of Productivity and Resource Protection

Concerns for resource protection have increasingly permeated the research carried out across the system. There is general consensus as to why this must be so, and productivity increase and natural resource protection objectives are being merged into a continuum in the design of the research projects. This lays a particularly heavy onus on the centers to ensure an appropriate overall balance in progress toward both kinds of objectives.

But the balance is difficult to strike for several reasons. One reason is that international research in the area of natural resources management is relatively new. Standard indicators of progress are not widely accepted, and changes may take many years to manifest themselves. A second reason is that available evidence suggests that some degree of resource degradation may be inevitable if the rate of increase in global

food production required over the next decade or two is to be achieved.¹ A third reason is that the critical dimension refers to the relative timing of realizing the benefits of research in the productivity and resource protection areas.

The case of Latin America, which is so rich in natural resources, may illustrate the point. The soils of 200 million hectares of land are now estimated to be moderately or severely degraded by misuse.² The region has the highest rate of deforestation in the world (7.3 million hectares a year);³ with its consequent loss of biodiversity. At the same time, the number of poor rose 44 percent from 1980 to 1990, and the proportion of the population so classified also increased (from 41 to 46 percent). This proportional increase still continues in countries as nominally rich as Venezuela. The effect of the rise in poverty on the degradation of resources is well recognized.⁴ Significantly, too, the land area devoted to the cultivation of coca more than doubled in the decade of the 1980s.

Whatever advances in natural resource protection are potentially available through research, degradation and land misuse are likely to continue to escape control until greater progress is made to improve the welfare of the most disadvantaged of the local populations. This seems to imply that the productivity and resource protection components of research programs must be balanced in such a time frame that opportunities for increasing productivity in the shortest possible term are not foregone. Otherwise, degradation will continue and the cost of future increments will be far greater.

Balances in Partnership

The second example refers to the complexity of working effectively in partnership, a theme to which the *Lucerne Action Program* gave considerable prominence.

Cooperation between the CGIAR centers themselves has been brought into the limelight recently by the emergence of systemwide programs. These seek a clear additional benefit from cooperative work, beyond that likely to be obtained by the centers working separately, yet in coordination. The livestock program is a particularly good example which was designed to draw out from center crop and livestock programs new research themes which would be mutually beneficial.

Formal programs of this kind are obviously not required for continuing improvement in the cohesion and complementarity of research work across the system. Center scientists are already extremely conscious of the need for this and improvements are being made all the time. Any important gaps will continue to be identified by the types of review which are regularly carried out on given topics across the system.

The recent proliferation of proposals for systemwide program funding may, therefore, be partly explained by the interest expressed in program funding by several donors. The challenge for the centers is to define those which really enrich their own programs and enhance the likelihood of achieving their mission, thus justifying the extra time and effort required. Any tendency for program funding to take place at the expense of institutional support will undermine the long-term health of the system. The success of the program depends directly on the strength of the centers involved. If their individual essence and initiatives are diminished, they will cease to attract and retain top quality scientists and science managers.

The other level of partnership which has been given wide prominence discussed recently is that between the CGIAR and national partners in the "South." That these links are vital to the implementation of the CGIAR's work, and to ensuring its permanent relevance, has never been in doubt. Important steps are being taken to institutionalize interactions at the level of TAC and the CGIAR itself, a process which will surely be assisted by the recent admission to the Group of new "Southern" members.

These processes can be distinguished, however, from that of partnership in the actual execution of research. Most recent external reviews suggest that the international centers take this responsibility extremely seriously and that relations with their national partners are very good. Yet the incessant calls for improved partnership suggest that expectations have somehow not been met.

In this era of "openness," those of us who work in national research systems in the "South" have a special responsibility to help dispel any note of idealism from these discussions. The complexity of establishing fruitful cooperative arrangements for research must not be underestimated and expectations must be realistic. The process the centers face of becoming acquainted with, and making themselves known to, the new and changed institutions which are their potential partners is slow, despite the amount of information

the centers regularly publish. The rest of the problems which national institutions have to solve before they can play their part as effective, stable partners in research are well documented, even in regions like Latin America where lack of training is not an obviously limiting factor.⁵ We in the national systems have much to learn from the CGIAR's renewal process and, in the same vein of severe self-evaluation, must seriously assume our own obligation to go continuously further to meet the CGIAR in its endeavors.

The challenge here for the centers is to ensure sensitive dialogue. This can be done without compromising the leadership which their long, stable, and independent experience often confers, and which can be used to great advantage by the NARS in their attempts to obtain greater political and economic support. Once it is clearly recognized by national partners that they and the CGIAR share the same overall goals, but have different, complementary roles in progressing toward them, then it is easier to find imaginative ways to foster joint endeavors of mutual benefit.

CONCLUSION

Reflections such as these suggest that the most important immediate challenge is for the international centers to distill out the richness of the renewal process and strike the necessarily judicious balances in the design and execution of their research programs. Those who have been privileged to be associated with any of them will be convinced of their ability to do so. But after the last turbulent years, time is now needed for thought and for intensifying research activities. This requires the rest of the system to provide a period of supportive stability. It is also essential that profound insights and a full degree of realism are brought to bear in the evaluation of the results. Boards of trustees and center staff, management, scientists, and partners will certainly march together now, as never before, to ensure success.

¹ McCalla, A. 1994. *Agriculture and Food Needs to 2025: Why We Should Be Concerned*. Sir John Crawford Memorial Lecture, 1994. CGIAR Secretariat, Washington, DC.

² Garrett, James (ed.). 1995. *A 2020 Vision for Food, Agriculture and the Environment in Latin America*. IFPRI, Washington, DC.

³ Serroa, E. A. 1994. "Technologies and Policies to Halt Deforestation in Tropical Rain Forests." In *Needs and Priorities for Forestry and Agroforestry Policy Research in Latin America*, M. Alfaro, R. de Camino, M. I. Mora, and P. Oram, (eds.). IICA, San José, Costa Rica.

⁴ Winograd, M. 1995. *Indicadores Ambientales para Latinoamérica y el Caribe: Hacia la Sustentabilidad en el Uso de Tierras*. Proyecto IICA/GTZ, OEA, WRI. IICA, San José, Costa Rica. p.84.

⁵ IICA. 1993. *Informe Final Técnico*. Proyecto IICA-GID-ATN/SF-3410. IICA, San José, Costa Rica.



Hans R. Herren

1995 WORLD FOOD PRIZE

The 1995 World Food Prize was awarded to Dr. Hans R. Herren for work he conducted while an entomologist at IITA on the biological control of the cassava mealybug. The World Food Prize is considered the foremost international award recognizing the achievements of individuals who have advanced human development by improving the quality, quantity, or availability of food in the world.

At IITA, Dr. Herren led a project, from its conception in 1979, which rescued cassava—one of Africa's most important staple food crops and consumed by 200 million people on the continent—from total destruction by a pest accidentally introduced to Africa from South America in the early 1970s. The cassava mealybug thrived in Africa because it had no natural enemies. By the late 1970s, the pest was destroying as much as 80 percent of the cassava crop in some areas, and was spreading rapidly.

Following the discovery of the cassava mealybug in Paraguay by Dr. Anthony Bellotti of CIAT, a tiny wasp that was the mealybug's natural enemy was identified. The predator wasps were brought to Africa, mass bred, and released by airplane over the cassava growing belt—an area one and a half times the size of the United States. At the end of seven years, the wasps had brought the mealybug problem under control in thirty African nations.

The benefit of this project to African farmers has been estimated at about \$3 billion. Also notable is that this large-scale pest control effort was achieved without the use of chemicals pesticides.

Dr. Herren left IITA in 1994 to become Director General of the International Centre for Insect Physiology and Ecology in Nairobi, Kenya.

Cassava mealybug

PART *Three*

Facts to File

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*C*OMPUTER TRAINING IN MALI.
THROUGH ITS TRAINING AND CAPAC-
ITY STRENGTHENING PROGRAM,
IFPRI'S OUTREACH DIVISION WORKS
TO PROMOTE LONG-TERM REGIONAL
INSTITUTIONAL AND RESEARCH
CAPACITY STRENGTHENING,
THROUGH SHORT-TERM TRAINING
COURSES AND GRADUATE STUDENT
RESEARCH PROGRAMS.

Who's Who in the CGIAR

CGIAR Chairman

Ismail Serageldin
Vice President, Environmentally Sustainable Development
World Bank

Cosponsors and Their Representatives

Food and Agriculture Organization of the United Nations
United Nations Development Programme

United Nations Environment Programme

World Bank

Henri Carsalade
Roberto Lenton¹
Timothy Rothermel²
Carlos Zulberti³
Jaime Hurtubia⁴
Michel Petit

CGIAR Executive Secretary

Alexander von der Osten

TAC Chair

Donald Winkelmann

TAC Executive Secretary

Shelleemiah Keya⁵

Guido Gryseels⁶

TAC Members

Andre Berkaloff
Hosny El-Lakany⁷
Hans Gregersen⁷
Ted Henzell
E. A. Huisman
Keiji Kainuma⁸
Uma Lele⁷
Eugenia Muchnik de Rubenstein⁷

Richard Sylvester Musangi
C. Hanumantha Rao⁹
Sir Ralph Riley
Ammar Siamwalla
P. M. Tigerstedt
Saydil-Moukhtar Toure⁷
Lucia de Vaccaro⁹
Maria José de Oliveira Zimmermann

Finance Committee

World Bank, Chair
Australia
Brazil⁷
Canada
Denmark⁷
Egypt⁸
Germany

IFAD⁸
India⁸
Japan
The Netherlands⁸
The Philippines⁷
United Kingdom

Oversight Committee

Paul Egger, Chair (Switzerland)
Andrew Bennett (United Kingdom)⁹
Henri Carsalade (FAO)⁷
Fernando Chaparro (Colombia)⁹
V. L. Chopra (India)⁷
Teresa Fogelberg (The Netherlands)⁹

Robert Herdt (Rockefeller Foundation)⁰
Johan Holmberg (Sweden)¹⁰
Manuel Lantin (The Philippines)^{8,10}
John Van Dusen Lewis (United States)
Cyrus Ndiritu (Kenya)⁸

Genetic Resources Policy Committee

M. S. Swaminathan, Chair
 Bo Bengtsson
 Jurg Benz
 Robert Bertram

Adel El-Beltagy
 Geoffrey Hawtin
 George Rothschild
 Maria José de Oliveira Zimmermann

NGO Committee

Robert Blake, Chair
 Miguel Altieri
 Alicia Barcena¹⁰
 Kamla Chowdhry
 Bernd Dreesmann

Yolanda Kakabadse⁹
 Jeffrey McNeely
 Jeanot Minila Mfou'ou
 Didier Pillot
 Ranil Senanayake

Impact Assessment Evaluation Group

W. James Peacock, Chair
 Eleanor Chelimsky

Tim Healy
 Eugenia Muchnik de Rubenstein

Private Sector Committee

Andreas Buchting, Co-Chair
 Alejandro Rodriguez Graue, Co-Chair
 Pramod Agrawal
 Assia Bensalah Alaoui
 Carol Amaratunga

Bernard Auxenfans
 Sam Dryden
 Mohamad Adel El Ghandour
 Mohamad Hasan
 John Preston

CGIAR Members**Countries**

Australia
 Austria
 Bangladesh¹¹
 Belgium
 Brazil
 Canada
 China
 Colombia
 Côte d'Ivoire¹¹
 Denmark
 Egypt¹¹
 Finland
 France

Germany
 India
 Indonesia
 Iran¹¹
 Ireland
 Italy
 Japan
 Kenya¹¹
 Korea
 Luxembourg
 Mexico
 The Netherlands
 Nigeria
 Norway

Pakistan¹²
 The Philippines
 Romania¹¹
 Russian Federation
 Spain
 Sweden
 Switzerland
 Syria¹²
 United Kingdom
 United States of America

Foundations

Ford Foundation
 International Development Research Centre
 Kellogg Foundation
 Rockefeller Foundation

International and Regional Organizations

African Development Bank
Arab Fund for Economic and Social Development
Asian Development Bank
European Commission
Food and Agriculture Organization of the United Nations
Inter-American Development Bank
International Fund for Agricultural Development
Opec Fund for International Development
United Nations Development Programme
United Nations Environment Programme
World Bank

Regional Representatives

Africa	Ghana and Zimbabwe
Asia and the Pacific	Malaysia and Nepal
Europe	The Czech Republic and Estonia
Latin America and the Caribbean	Chile and El Salvador
Middle East and North Africa	Egypt and Iran

CGIAR Chairmen, 1971-1996

Ismail Serageldin	1994-
V. Rajagopalan	1991-1993
Wilfried Thalwitz	1990-1991
W. David Hopper	1987-1990
S. Shahid Husain	1984-1987
Warren Baum	1974-1983
Richard H. Demuth	1971-1974

CGIAR Executive Secretaries, 1972-1996

Alexander von der Osten	1989-
Curtis Farrar	1982-1989
Michael Lejeune	1975-1982
Harold Graves	1972-1975

TAC Chairs, 1971-1996

Donald Winkelmann	1994-
Alex McCalla	1988-1994
Guy Camus	1982-1987
Ralph Cummings	1977-1982
Sir John Crawford	1971-1976

TAC Executive Secretaries, 1971-1996

Shellemiah Keya	1996-
Guido Gryseels ¹³	1995-1996
John Monyo	1985-1994
Alexander von der Osten	1982-1985
Philippe Mahler	1976-1982
Peter Oram	1971-1976

¹ From June 1996.

² Until June 1996.

³ From March 1996.

⁴ Until March 1996.

⁵ From April 1996.

⁶ Officer-in-Charge, until April 1996.

⁷ Departed the Committee in 1995.

⁸ Joined the Committee in 1995.

⁹ Joined the Committee in 1996.

¹⁰ Departed the Committee in 1996.

¹¹ Joined the CGIAR in 1995.

¹² Joined the CGIAR in 1996.

¹³ Officer-in-Charge.

CGIAR Centers

Centro Internacional de Agricultura Tropical—CIAT

(International Center for Tropical Agriculture)

Headquarters: Cali, Colombia

Board Chair: Lucia de Vaccaro (until November 1995)
Robert Havener (from December 1995)

Director General: Robert Havener (until June 30, 1995)
Grant Scobie (from July 1995)

Founded: 1967

Focus: To contribute to the alleviation of hunger and poverty in tropical countries by applying science to the generation of technology that will lead to lasting increases in agricultural output while preserving the natural resource base. Research is conducted on germplasm development of beans, cassava, tropical forages, and rice for Latin America and on resource management in humid agroecosystems in tropical America, including hillsides, forest margins, and savannas.



Center for International Forestry Research—CIFOR

Headquarters: Bogor, Indonesia

Board Chair: Bo Bengtsson

Director General: Jeffrey Sayer

Founded: 1992

Focus: To contribute to the sustained well-being of people in developing countries, particularly in the tropics, through collaborative strategic and applied research in forest systems and forestry, and by promoting the transfer of appropriate new technologies and the adoption of new methods of social organization for national development.



Centro Internacional de Mejoramiento de Maiz y Trigo—CIMMYT

(International Center for the Improvement of Maize and Wheat)

Headquarters: Mexico City, Mexico

Board Chair: Louisa van Vloten-Doting (until April 18, 1996)
Walter Falcon (from April 19, 1996)

Director General: Roger Rowe (until September 30, 1995)
Timothy Reeves (from October 1, 1995)

Founded: 1966

Focus: To help the poor by increasing the productivity of resources committed to maize and wheat in developing countries, while protecting the environment, through agricultural research and in concert with national research systems.



Centro Internacional de la Papa—CIP

(International Potato Center)

Headquarters: Lima, Peru

Board Chair: Lindsay Innes (until April 30, 1995)
Martha ter Kuile (from May 1, 1995)

Director General: Hubert Zandstra

Founded: 1971

Focus: To contribute to increased food production, the generation of sustainable and environmentally sensitive agricultural systems, and improved human welfare by conducting coordinated, multidisciplinary research programs on potato and sweet potato, by carrying out worldwide collaborative research and training, by catalyzing collaboration among countries in solving common problems, and by helping scientists worldwide to respond flexibly and successfully to changing demands in agriculture.



International Center for Agricultural Research in the Dry Areas—ICARDA

Headquarters: Aleppo, Syria

Board Chair: Alfred Bronnimann

Director General: Nasrat Fadda (until January 31, 1995)
Adel El-Beltagy (from February 1, 1995)

Founded: 1977

Focus: To meet the challenge posed by a harsh, stressful, and variable environment in which the productivity of winter rainfed agricultural systems must be increased to higher sustainable levels, in which soil degradation must be arrested and possibly reversed, and in which water use efficiency and the quality of the fragile environment need to be ensured. ICARDA has a world responsibility for the improvement of barley, lentils, and faba bean, and a regional responsibility in West Asia and North Africa for the improvement of wheat, chickpea, forages, and pasture. ICARDA emphasizes range-land improvement, small ruminant management and nutrition, and rainfed farming systems associated with these crops.



International Center for Living Aquatic Resources Management—ICLARM

Headquarters: Metro Manila, The Philippines

Board Chair: John L. Dillon

Director General: Meryl J. Williams

Founded: 1977

Focus: To improve the production and management of aquatic resources, for sustainable benefits to present and future generations of low-income



producers and consumers in developing countries, through international multidisciplinary research in partnership with national agricultural research systems. The declining state and threatened sustainability of fisheries due to overfishing exacerbated with poverty and pollution, and the potential for increases in aquaculture production, call for research which includes understanding of the dynamics of coastal and coral reef resource systems and of integrated agriculture–aquaculture systems, investigating alternative management schemes in these systems, and improving the productivity of key species.

International Centre for Research in Agroforestry—ICRAF

Headquarters: Nairobi, Kenya
Board Chair: David B. Thorud
Director General: Pedro A. Sanchez
Founded: 1977

Focus: To mitigate tropical deforestation, land depletion, and rural poverty through improved agroforestry systems. Trees in farming systems can increase and diversify farmer income, make farming systems more robust, reverse land degradation, and reduce the pressure on natural forests. ICRAF carries out research with national agricultural and forestry research systems, non-governmental organizations, and other research partners, and is focused on two major thrusts: finding alternatives to slash and burn agriculture in the humid tropics; and overcoming land depletion in subhumid and semi-arid Africa.



International Crops Research Institute for the Semi-Arid Tropics—ICRISAT

Headquarters: Patancheru, Andhra Pradesh, India
Board Chair: Eric H. Roberts (until March 31, 1996)
Hans-Jorgen von Maydell (from April 1, 1996)
Director General: James G. Ryan
Founded: 1972

Focus: To conduct research leading to enhanced sustainable food production in the harsh conditions of the semi-arid tropics. ICRISAT's main crops—sorghum, finger millet, pearl millet, chickpea, pigeonpea, and groundnut—are not generally known in the world's more favorable agricultural regions, but they are vital to life for the one-sixth of the world's population that lives in the semi-arid tropics. ICRISAT conducts research in partnership with the national agricultural systems that encompasses the management of the region's limited natural resources to increase the productivity, stability, and sustainability of these and other crops.



International Food Policy Research Institute—IFPRI

Headquarters: Washington, DC, USA
Board Chair: David Bell
Director General: Per Pinstrup-Andersen
Founded: 1975

Focus: IFPRI was established to identify and analyze alternative national and international strategies and policies for meeting the food needs of the developing world on a sustainable basis, with particular emphasis on low-income countries and on the poorer groups in those countries. While IFPRI's research is specifically geared to contributing to the reduction of hunger and malnutrition, the factors involved are many and wide-ranging, requiring analysis of underlying processes and extending beyond a narrowly defined food sector. IFPRI collaborates with governments and private and public institutions worldwide interested in increasing food production and improving the equity of its distribution. Research results are disseminated to policymakers, administrators, policy analysts, researchers, and others concerned with national and international food and agricultural policy.



International Irrigation Management Institute—IIMI

Headquarters: Colombo, Sri Lanka
Board Chair: Les Swindale
Director General: Randy Barker (from January 1, 1995 to August 31, 1995)
David Seckler (from September 1, 1995)
Founded: 1984

Focus: IIMI's mission is to foster improvement in the management of water resource systems and irrigated agriculture. IIMI conducts a worldwide program to generate knowledge to improve water resource systems and irrigation management, to strengthen national research capacity, and to support the introduction of improved technology, policies, and management approaches.



International Institute of Tropical Agriculture—IITA

Headquarters: Ibadan, Nigeria
Board Chair: Pierre Dubreuil
Director General: Lukas Brader
Founded: 1967

Focus: IITA conducts research and outreach activities, with partner programs in countries of Sub-Saharan Africa, to help those countries increase food production on an ecologically sustainable basis. IITA seeks to improve the food quality, plant health, and postharvest processing of its mandated crops—cassava, maize, cowpea, soybean, yam, and banana and plantain—while strengthening national research capabilities.



International Livestock Research Institute—ILRI

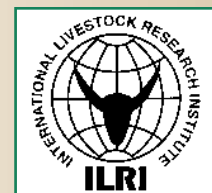
Headquarters: Nairobi, Kenya

Board Chair: Neville Clarke

Director General: Hank Fitzhugh

Founded: 1995

Focus: To increase animal health, nutrition, and productivity (i.e., milk, meat, traction) by removing constraints to tropical livestock production, particularly among small-scale farmers; to protect environments supporting animal production against degradation by tailoring production systems and developing technologies that are sustainable over the long-term; to characterize and conserve the genetic diversity of indigenous tropical forage species and livestock breeds; and to promote equitable and sustainable national policies for the development of animal agriculture and the management of natural resources affected by animal production, encouraging, in particular, those policies that support strategies for reducing hunger and poverty, for improving food security, and for protecting the environment.



International Plant Genetic Resources Institute—IPGRI

Headquarters: Rome, Italy

Board Chair: Wanda Collins

Director General: Geoffrey Hawtin

Founded: 1974

Focus: To encourage, support, and engage in activities to strengthen the conservation and use of plant genetic resources worldwide, with special emphasis on developing countries, by undertaking research and training and by providing scientific and technical information.



International Rice Research Institute—IRRI

Headquarters: Manila, The Philippines

Board Chair: Emil Javier (until April 12, 1996)

Roelof (Rudy) Rabbinge (from April 13, 1996)

Director General: Klaus Lampe (until March 1995)

George Rothschild (from April 1, 1995)

Founded: 1960

Focus: To improve the well-being of present and future generations of rice farmers and consumers, particularly those with low incomes, by generating and disseminating rice-related knowledge and technology of short- and long-term environmental, social, and economic benefit and by helping to enhance national rice research.



International Service for National Agricultural Research—ISNAR

Headquarters: The Hague, The Netherlands

Board Chair: Charles Edward Hess

Director General: Christian Bonte-Friedheim

Founded: 1979

Focus: To help developing countries bring about sustained improvements in the performance of their national agricultural research systems and organizations. ISNAR does this by supporting their efforts in institutional development, promoting appropriate policies and funding for agricultural research, developing or adapting improved research management techniques, and generating and disseminating relevant knowledge and information.



West Africa Rice Development Association—WARDA

Headquarters: Bouaké, Côte d'Ivoire


Board Chair: Just Faaland

Director General: Eugene R. Terry

Founded: 1970

Focus: WARDA's work is aimed at strengthening the capability of agricultural scientists in West Africa for technology generation to increase the sustainable productivity of intensified rice-based cropping systems in a manner that improves the well-being of resource-poor farm families and that conserves and enhances the natural resource base. Research covers rice grown in mangrove swamps, inland valleys, upland conditions, and irrigated conditions.



A close-up photograph of a Nepalese woman sitting on the ground, shelling maize. She is wearing a white shirt and a colorful patterned sari. She is holding a maize cob in her left hand and using a small wooden tool to remove the kernels with her right hand. The background is blurred, showing more maize cobs and a wooden bowl.

A NEPALESE WOMAN SHELLING MAIZE, ONE OF THE DIETARY MAINSTAYS IN THAT COUNTRY. CIMMYT'S MAIZE PROGRAM INVESTS HEAVILY IN RESEARCH AIMED AT PRODUCING IMPROVED VARIETIES THAT NATURALLY PERFORM BETTER IN AREAS WHERE PRODUCTION IS LIMITED BY INSECTS AND DISEASES, OR BY SUCH ABIOTIC STRESSES AS DROUGHT, LOW SOIL FERTILITY, AND ACID SOILS. VARIETIES THAT PERFORM BETTER UNDER SUCH CONDITIONS ARE ESPECIALLY BENEFICIAL TO SMALL, RESOURCE-POOR FARMERS TILLING MORE MARGINAL LANDS.

CGIAR Contributions to the Agreed Research Agenda by Member, 1972-1995

CGIAR Contributions to the Agreed Research Agenda by Member, 1972-1995 (in \$ million)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Total	
Industrialized Countries																										
Australia		0.0	1.0	1.2	1.7	1.8	2.6	2.7	3.0	3.3	3.8	4.1	4.0	4.2	4.5	2.8	3.1	3.7	3.8	3.2	4.4	4.2	4.8	5.6	73.6	
Austria																										
Belgium	0.1	0.6	0.4	0.6	1.7	2.3	2.7	3.1	3.3	2.4	1.9	1.9	1.7	2.0	1.8	2.7	2.5	2.5	3.2	3.3	3.3	2.5	3.6	4.9	58.0	
Canada	1.2	1.8	4.7	4.3	5.4	6.8	7.4	7.5	6.9	7.5	8.3	9.9	10.0	9.7	10.7	11.8	13.8	14.4	15.4	15.7	17.6	15.8	15.3	12.7	234.4	
Denmark	0.3	0.2	0.4	0.4	0.5	0.6	0.8	1.0	1.2	1.1	1.0	1.0	1.2	1.1	1.7	2.3	2.5	2.6	3.6	3.4	4.9	4.8	7.3	10.0	63.7	
Finland																										
France		0.1	0.4	0.5	0.4	0.5	0.4	0.3	0.7	0.9	0.8	0.9	1.0	0.9	1.2	2.1	3.2	3.3	3.6	4.1	4.1	4.9	3.2	3.9	4.7	46.3
Germany	1.8	3.0	3.9	4.5	5.4	6.8	8.5	10.1	8.4	7.8	7.9	6.7	6.2	6.0	10.4	10.8	11.2	11.2	11.2	11.0	13.7	13.3	16.6	15.8	202.9	
Ireland																										
Italy																										
Japan	0.1	0.2	0.3	0.7	1.2	2.5	3.5	4.8	7.0	8.1	8.9	9.1	9.7	11.1	15.9	18.0	20.2	19.9	23.2	23.7	26.9	32.6	36.4	33.9	317.8	
Luxembourg																										
Netherlands	0.4	0.4	0.6	1.2	1.5	1.7	1.8	2.4	2.6	3.0	3.2	3.6	3.3	3.8	6.7	5.6	6.3	5.5	6.9	6.5	7.6	8.3	11.5	12.8	107.2	
New Zealand																										
Norway	0.8	0.2	0.4	0.8	1.1	1.5	1.9	2.0	2.0	1.9	1.9	2.2	1.9	2.3	3.1	3.2	3.9	4.1	4.7	4.7	5.8	4.7	5.4	6.1	66.5	
Romania																										
Russian Fed.																										
Saudi Arabia																										
Spain																										
Sweden	1.0	0.2	1.5	2.3	2.3	2.2	2.7	3.1	3.4	3.3	3.2	3.1	3.1	3.0	4.2	4.9	5.4	5.5	6.2	6.1	6.6	6.2	8.4	7.3	97.1	
Switzerland																										
United Kingdom	0.7	1.1	1.9	2.4	2.9	3.5	4.8	6.4	6.8	6.0	6.3	5.9	5.7	6.3	8.4	10.3	11.5	10.9	11.6	11.5	11.1	9.4	9.8	9.9	166.1	
USA	3.8	5.4	6.8	10.8	14.9	18.1	21.1	24.8	29.0	35.0	40.8	44.6	45.3	45.2	46.3	40.2	42.2	44.1	45.1	45.6	48.1	40.5	32.3	32.1	762.0	
Subtotal	8.2	12.3	21.2	28.6	40.2	49.1	57.8	69.0	79.4	85.2	92.9	107.5	109.7	109.2	131.7	137.7	147.6	153.8	161.4	163.1	176.3	161.7	174.8	174.8	2,464.4	
Developing Countries																										
Brazil																										
China																										
Cote d'Ivoire																										
Colombia																										
Egypt																										
India																										
Indonesia																										
Iran																										
Kenya																										
Korea																										
Mexico																										
Nigeria																										
Philippines																										
Subtotal	0.0	0.0	0.0	0.8	2.8	2.8	1.8	0.8	1.3	1.3	0.8	1.3	1.0	0.9	0.9	0.9	0.8	0.8	0.9	1.2	1.8	2.3	3.1	5.0	48.7	
Foundations																										
Ford Fdn.	5.3	3.7	3.0	2.8	2.0	1.6	1.0	1.0	1.3	1.3																
Kellogg Fdn.	0.2	0.3	0.3	0.3	0.3	0.3	0.3																			
Kresge Fdn.	0.8																									
Leverhulme Trust																										
Rockefeller Fdn.	4.0	4.5	3.5	2.9	2.2	1.6	1.3	1.2	1.6	1.0	0.8	0.5	0.5	0.8	0.9	0.9	0.9	1.9	1.7	0.9	1.5	0.9	1.3	1.7	38.9	
Saskatchewan Fdn.																										
Subtotal	10.2	8.5	8.8	6.0	4.5	3.5	2.6	2.2	3.4	2.9	2.3	3.2	2.6	2.3	2.5	1.8	1.7	2.7	2.7	2.1	3.2	3.1	4.6	4.2	89.5	
International & Regional Organizations																										
ADB																										
AFDB																										
Arab Fund																										
CFC v																										
EEC																										
IDB																										
IDRC	0.2	0.3	0.6	1.0	1.8	1.3	1.0	0.8	1.5	1.0	1.2	1.8	1.0	1.3	1.2	0.8	0.6	0.8	0.5	0.9	0.5	1.1	0.8	1.1	22.7	
IFAD																										
OPEC Fund																										
Others v	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
UNDP	0.9	1.0	1.5	2.2	1.9	3.5	4.4	4.0	4.6	5.2	6.2	6.9	8.1	7.5	8.4	8.7	9.0	7.5	6.3	6.6	6.9	7.3	9.5	8.4	136.3	
UNEP																										
World Bank	1.3	2.8	2.4	3.2	6.5	7.9	8.7	10.2	12.0	14.6	16.3	19.0	24.3	28.1	28.4	30.0	30.0	33.3	34.3	35.1	37.6	40.0	50.0	50.0	526.0	
Subtotal	2.3	4.1	6.5	11.4	15.6	22.0	22.9	27.4	34.2	39.8	46.5	52.0	56.3	58.1	56.4	60.7	61.0	67.0	68.7	65.1	68.0	67.6	85.6	85.6	1,081.8	
Total	20.7	25.0	34.5	47.5	62.9	77.2	85.0	98.6	119.6	130.9	143.8	164.7	173.2	170.1	192.2	201.6	211.5	224.5	234.9	232.0	247.3	234.7	288.1	288.1	3,571.2	

1/ Non-CGIAR member.

CGIAR Contributions to the Agreed Research Agenda by Center, 1972-1995

CGIAR Contributions to the Agreed Research Agenda by Center, 1972-1995 (in \$ million)^{1/}

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Total
CIAT	4.3	6.1	5.5	6.0	6.3	9.5	11.7	13.4	15.0	16.2	18.6	21.7	23.5	21.2	22.0	24.1	24.4	28.4	27.7	27.9	26.9	26.3	28.9	26.8	441.3
CIFOR																					3.2	5.1	6.8	7.7	21.8
CIMMYT	5.0	6.3	6.1	7.6	8.7	10.1	12.7	14.9	16.6	18.4	18.3	17.5	20.7	19.4	21.3	23.3	25.9	27.9	27.1	26.6	26.1	23.1	27.2	26.4	437.2
CIP	0.6	1.3	2.2	2.7	4.1	5.6	5.4	7.1	7.7	9.0	9.6	10.1	9.7	10.2	13.3	12.8	17.8	18.6	16.9	17.1	15.3	14.7	18.8	19.9	250.5
ICARDA					1.5	4.6	7.5	10.1	11.8	13.1	15.0	19.7	21.0	17.8	18.0	18.3	17.3	18.4	18.7	19.5	17.9	16.2	18.3	18.7	303.4
ICLARM																					4.5	3.8	4.8	7.6	20.7
ICRAF																					11.1	11.2	16.5	16.2	53.9
ICRISAT	0.3	2.7	3.8	6.1	6.8	9.8	12.6	11.8	12.3	13.0	15.9	21.0	21.0	20.3	25.0	26.2	26.0	30.1	31.5	29.4	27.3	26.0	27.6	26.0	432.6
IFPRI				0.3	0.8	1.2	1.6	1.9	2.5	2.8	3.1	3.8	4.3	4.4	4.9	6.0	8.7	8.8	9.1	8.9	8.3	8.1	9.3	9.7	108.2
ILRI																					6.4	6.1	7.3	7.2	27.0
ITA	6.4	6.1	6.7	8.5	9.4	10.7	14.9	15.7	15.5	15.5	18.8	19.9	20.9	20.4	21.1	19.9	21.1	22.0	22.5	22.4	21.7	20.8	24.1	22.2	407.5
ILRI ^{2/}			1.0	3.7	8.9	11.9	15.2	16.2	18.9	18.5	16.9	19.8	21.9	22.5	25.8	25.7	29.1	33.7	33.8	32.9	28.4	22.2	25.0	24.3	456.4
IPGRI ^{3/}				0.5	0.9	1.3	1.7	2.4	3.0	3.0	3.6	3.6	4.0	4.2	5.1	5.5	5.9	7.1	7.0	8.1	10.8	10.4	14.0	12.6	114.7
IRRI	3.0	3.1	6.0	8.5	9.7	12.0	12.4	13.8	15.9	17.2	19.5	20.2	19.7	21.0	24.2	24.9	26.5	26.6	29.8	29.8	28.6	26.3	28.2	27.2	453.9
ISNAR									1.1	2.2	2.3	3.0	3.3	3.7	4.5	5.5	6.8	7.6	7.0	7.6	7.0	6.1	6.4	6.4	80.4
WARDA			0.5	0.6	0.8	1.3	1.9	1.8	2.6	2.0	2.2	2.8	2.0	2.5	3.1	4.2	5.4	6.1	6.2	6.7	5.6	5.4	6.7	8.1	78.3
Subtotal	19.5	25.7	31.7	44.4	58.0	77.9	97.6	109.1	122.8	130.9	143.9	163.0	172.0	167.6	188.4	196.3	214.9	235.2	237.4	236.7	249.2	230.6	268.1	267.1	3,688.0
Stabilization fund												1.7	1.0	2.6	3.8	5.3	-3.4	-10.7	-2.5	-4.7	-1.9	4.1		2.5	-2.3
Total	19.5	25.7	31.7	44.4	58.0	77.9	97.6	109.1	122.8	130.9	143.9	164.7	173.0	170.2	192.2	201.6	211.5	224.5	234.9	232.0	247.3	234.7	268.1	269.6	3,685.8

1/ Figures shown for 1972-1980 are total expenditures (operations/capital) and may be higher or lower than the contributions for that year (due to the accounting convention followed in the seventies).

2/ Formerly ILCA and ILRAD.

3/ Formerly IBPGR and INIBAP.